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ENVIRONMENTAL STATEMENT FOR LOCAL FLOOD PROTECTION PROJECT AT T--ETC(U)
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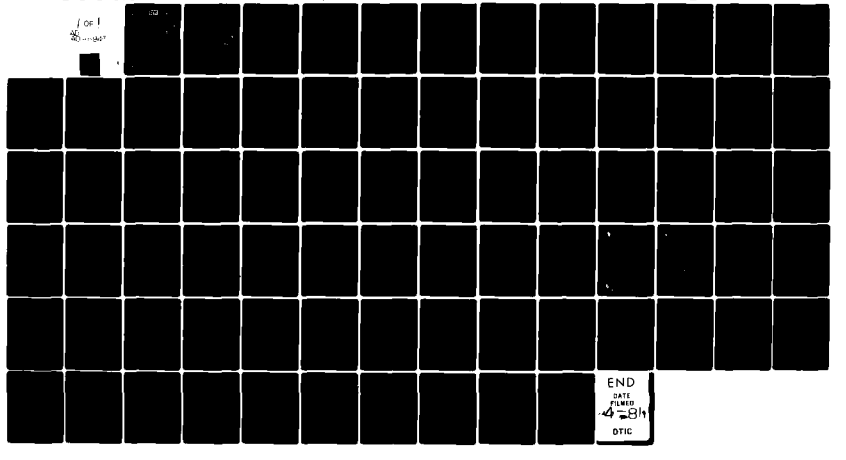

LEVEL II

FINAL SUPPLEMENT TO

FINAL ENVIRONMENTAL STATEMENT

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LOCAL FLOOD PROTECTION PROJECT

AT

THREE RIVERS, TEXAS

US ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Frio River
Live Oak County, Texas
Nueces River
Three Rivers Local Flood Protection Project

20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Environmental impact statement/report purposes to construct a levee system to protect the city of Three Rivers, Texas from flooding of Frio and Nueces Rivers. No known historical and five archaeological sites will be disturbed. The project will change the land use, but will not conflict with other land use plans for the area. The esthetic quality of the area will be less pleasing with the levee and borrow pits, but the 67 acres of borrow areas may be converted from terrestrial to aquatic habitat. The contractor will have the major responsibility of protecting the environmental resources in connection with the project's

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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20. construction.

SUMMARY

THREE RIVERS LOCAL FLOOD PROTECTION
PROJECT, FRIO RIVER, LIVE OAK COUNTY, TEXAS

( ) Draft Supplement to Final Environmental Statement

(x) Final Supplement to Final Environmental Statement

Responsible Office: US ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
Colonel John F. Wall
PO Box 17300
Fort Worth, Texas 76102
Telephone: 817 334-2301

1. Name of Action: (x) Administrative ( ) Legislative

2. Description of Action: Construct levee system to protect the city of Three Rivers, Texas, from flooding of Frio and Nueces Rivers.

3. a. Environmental Impacts: The project will protect the lives and property of about 475 families who live in the community. The 4.6-mile long levee and three borrow areas will involve about 176.7 acres of land. No known historical and five archeological sites will be disturbed. The 67 acres of borrow areas may be converted from terrestrial to aquatic habitat. The project will not conflict with other land use plans for the area.

b. Adverse Environmental Effects: The project will require change in land use of approximately 176.7 acres. There may be a slight localized increase in air, water, and noise pollution during construction. The esthetic characteristics of the area may be less pleasing with the levee and borrow pits. Eight family units will be relocated.

4. Alternatives: Reservoir flood control, improved channels, flood proofing, permanent evacuation of the community, levee system, flood warning, flood insurance, flood plain regulation, and no action.

5. Comments Requested:

US Department of Agriculture
US Department of Transportation
US Department of the Interior
US Department of Commerce
US Department of Health, Education, and Welfare
US Department of Housing and Urban Development
Federal Power Commission
Environmental Protection Agency
Advisory Council on Historic Preservation

Federal Energy Administration
Office of the Governor, State of Texas
Texas Highway Department
Texas State Historical Survey Committee
State Historic Preservation Officer
Texas Archeological Survey
Coastal Bend Council of Governments
Nueces River Authority
Live Oak County Judge
Three Rivers Mayor
Texas Committee on Natural Resources
Texas Archaeological Society
Citizens Environmental Coalition
Sierra Club
League of Women Voters of Texas
The Nature Conservancy
National Wildlife Federation
Wildlife Management Institute
Izaak Walton League of America, Inc.
Environmental Defense Fund
National Audubon Society
Sportsmen Clubs of Texas
Mrs. A. E. Adlof, Three Rivers, Texas

6. Final Statement to CEQ 13 November 1970
Draft Supplement to CEQ 28 January 1976
Final Supplement to CEQ _____

FINAL SUPPLEMENT TO
FINAL ENVIRONMENTAL STATEMENT

LOCAL FLOOD PROTECTION PROJECT
AT THREE RIVERS, TEXAS

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PLATES

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SECTION ONE - PROJECT DESCRIPTION

1.01 Specific Location. The city of Three Rivers, Texas, is located in Live Oak County on US Highway 281 about midway between the major cities of San Antonio and Corpus Christi. It is situated immediately adjacent to the left bank of the Frio River between Frio River miles 3 and 3.5.

1.02 Physical Description. The recommended plan of improvement is a protective earthfill levee about 4.6 miles in length. The levee begins at high ground east of the city and runs clockwise around about three-fourths of the city and ties back to high ground north of the city. Its entire alignment is east of the Frio River. Its planned maximum height is to be about 18 feet. The minimum levee freeboard (at the downstream portion of the levee) is 4 feet above the standard project flood (SPF) level. The standard project flood is defined as the flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. The freeboard was increased to 5 feet at the upstream limit along the Frio River, thereby providing additional protection from major floods in this portion of the floodway. Material for the levee will be selected and taken from three borrow pits located near the ends and center of the levee. The area on the city side of the levee will be drained by a V-bottom ditch extending from a point near the Frio River to a gated structure through the levee on Olds Slough. A small area near the northern end of the levee will be drained by a V-bottom ditch to Olds Slough. The existing channel of Olds Slough will require minor grading work to facilitate drainage, eliminate stagnant pools of water, and provide adequate sump capacity.

1.03 Two highways, US Highway 281 and State Highway 72 would be ramped or raised in place to provide access over the levee crown. The Missouri-Pacific railroad will require two closure structures where tracks cross through the levee.

1.04 The selected levee alignment will require floodwalls in two locations: between the city water treatment plant and the Frio River and between the city sewage treatment plant and the Frio River. Preliminary plans call for installing a shutoff valve on the present gravity sewage effluent outfall to prevent backing up during floods and a pumping system to get the effluent over the floodwall-levee system during the same period. The alignment will also require the relocation of 12 houses between Seguin Street and the Frio River. Plate 1 displays the features of the proposed project. Table I-1 presents the similarities and differences of the authorized plan and the recommended plan.

1.05 Purposes. This project was authorized to protect the city of Three Rivers, Texas, from the misery and destruction associated

TABLE I-1

COMPARISON OF THE AUTHORIZED PLAN AND THE RECOMMENDED PLAN

	Authorized Plan	Recommended Plan
Hydraulics and Hydrology:		
Total drainage area	15,600 sq mi	15,600 sq mi
Design flood frequency	SPF	SPF
Design floodflow	257,000 cfs	257,000 cfs
Interior drainage area	2.7 sq mi	2.5 sq mi
Principal Items of Work:		
Earth levees	4.5 miles	4.6 miles
Concrete floodwalls	-	650 feet
Outlet structures	3	1
Drainage ditches	2.2 miles	2.2 miles
Roadway ramps	2	2
Railroad ramps	2	0
Bridge alterations	2	1
Project Economics:		
Total first cost	$5,413,600	$3,675,000
Total annual charges	353,400	247,300
Total annual benefits	404,900	404,900
Benefit-cost ratio	1.1	1.64

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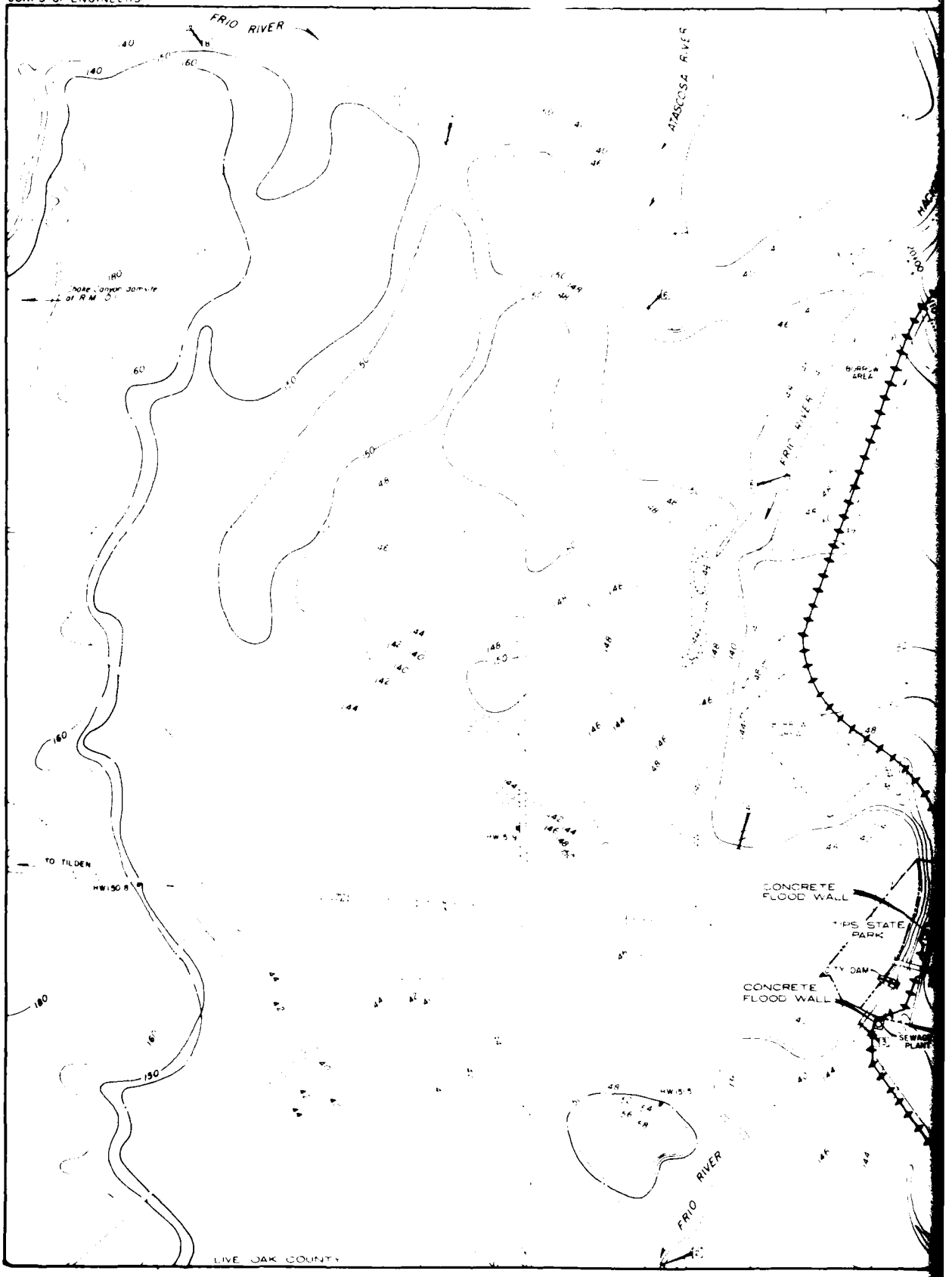

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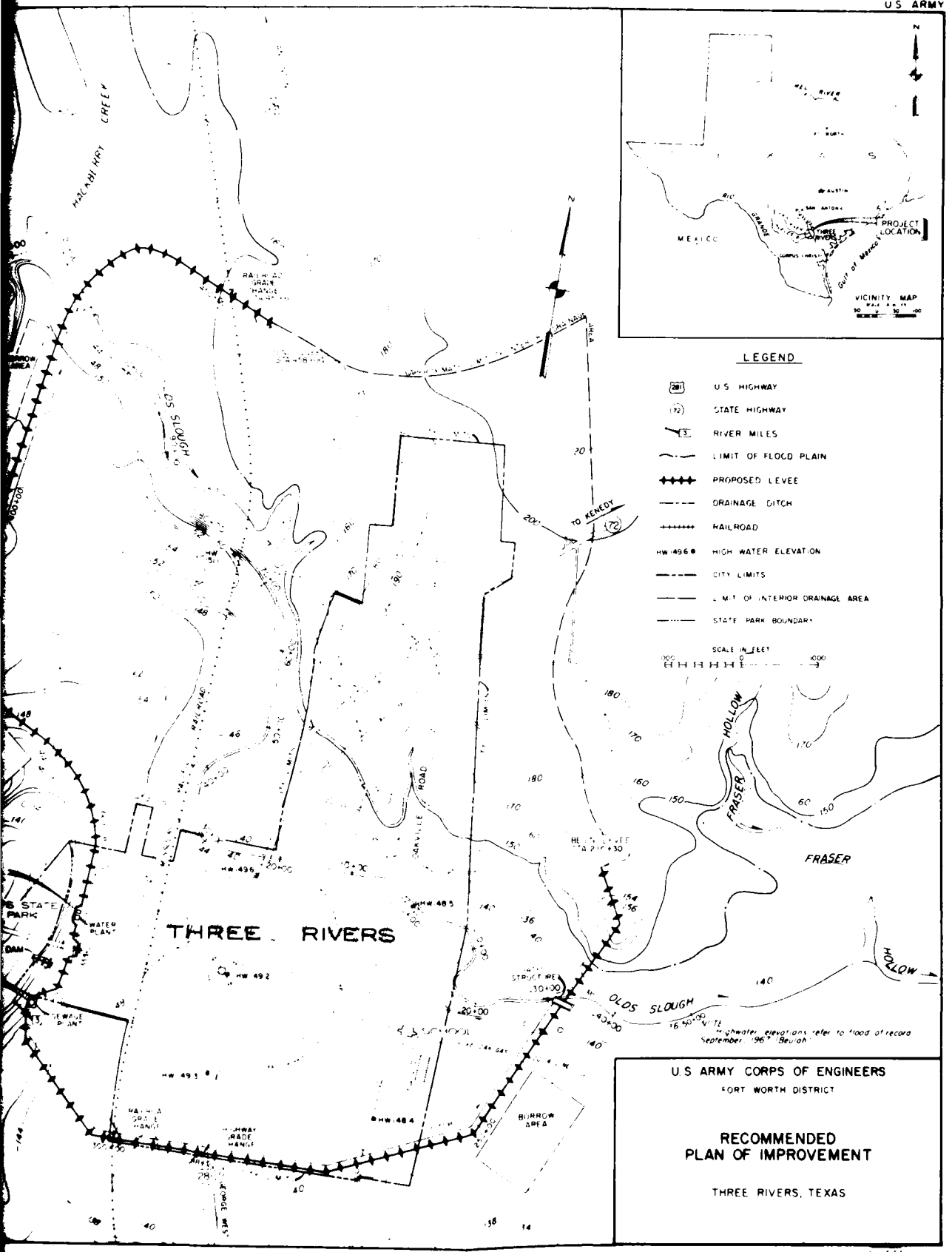


U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

RECOMMENDED PLAN OF IMPROVEMENT

THREE RIVERS, TEXAS

with the standard project flood on the Frio and Atascosa Rivers and backwaters from the Nueces River.

1.06 Benefits to be Derived. Records show that at least 15 floods have occurred since the beginning of gage records in 1915 which have produced urban damages in Three Rivers. The project was requested because about 1,600 people live in 453 houses located in the area subject to recurrent flooding. Additionally, 63 commercial and business establishments, churches, schools, streets, utilities, and transportation facilities are located in this same area. The total value of these physical properties is estimated to be $25,776,900. All of this will be protected from flood damage plus there will be a significant reduction in mental anguish and probability of adverse health conditions associated with floods.

1.07 Land Requirement. It is estimated that 176.7 acres of land will be needed for the project. This amount is that which will be bought in fee simple or easements by the local project sponsor, the city of Three Rivers, and will be utilized for levee placement and borrow areas.

1.08 Management of Project Resources. In compliance with one of the requirements for local participation in Federal flood control projects, as set out in National law, the local interests will "maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army."

1.09 Authorizing Document. Senate Resolution 14-8, 85th Congress, adopted 28 January 1958, called for information regarding the possibility of a Federally assisted local flood protection project on the Frio River in the vicinity of Three Rivers, Texas. This call was answered with a survey report resulting in Congressional authorization contained in Public Law 88-367, 88th Congress which was approved 9 July 1964. Initiation of an advanced study was authorized by advice of allotment C-232 dated 8 November 1965. The survey report was completed on 15 April 1970. It was referred to the Committee on Pulic Works on 3 August 1970. Subsequent appropriations made the detailed studies of this project possible.

1.10 Interrelationships with Other Water Resource Projects. The city of Three Rivers is somewhat centrally located in the Nueces River basin. Upstream the upper Nueces project exists on the Nueces River. There are four other projects being considered for development upstream. They are Choke Canyon on the Frio River, Sabinal on the Sabinal River, Concan on the Frio River, and Montell on the Nueces River. Development of the Choke Canyon project, to be constructed and operated by the Bureau of Reclamation for municipal and industrial water supply, is to begin soon. This project is to be some 4.5 miles upstream from the city of Three Rivers. Downstream of the city there exists one project, Lake Corpus Christi, which now supplies the city of Corpus Christi with municipal and industrial water. The other three projects are for flood control and aquifer recharge. Another project known as

R & M is planned as an alternate to the Choke Canyon project. The R & M project site is immediately downstream from the existing Lake Corpus Christi.

1.11 There are two existing channel improvement projects in the Nueces River basin. One is located at Poteet, Texas, and the other at Pleasanton, Texas. Both are on the Atascosa River which is one of the three rivers by which the city of Three Rivers derived its name.

1.12 Interrelationships of the referenced projects can be found primarily in the three proposed flood control projects and the Three Rivers Local Flood Protection Project. This is based on the fact that the city of Three Rivers is sometimes flooded from the south and east by high water on the Nueces River backing into the city via an unnamed slough and Olds Slough. The other projects are for localized flood protection or strictly for the capture of municipal and industrial water.

1.13 Project Status. The project is in phase I of the advanced engineering and design studies. Phase I in essence is a reevaluation of the information presented in the survey report to determine if the project is still worthy of consideration for construction.

1.14 Benefit-Cost Ratio. The proposed project is economically justified. Economic benefits resulting from flood prevention were estimated on a 100-year period of economic analysis. The estimated first costs include all initial expenditures for construction, including lands and damages, relocations, engineering and design, and supervision and administration. Annual charges include interest and amortization of investment cost at an interest rate of 6.125 percent for a period of amortization of 100 years, and the operation and maintenance cost. Under existing levels of flood plain development, average estimated damages prevented will be $394,900 annually. These damages are based on Corps estimates of property value in the flood prone area. Additionally, it is estimated that annual damages prevented to increased value placed on future development expected in the absence of a project will amount to $10,000. Based on the foregoing, the benefit-cost ratio is 1.64 to 1.

1.15 Environmental Protection (During Construction). The contract to be awarded for this project will include special provisions which will require the contractor to prepare an environmental protection plan to prevent environmental pollution during construction operations. Thus, the contractor will have the major responsibility of protecting the environmental resources in connection with the project's construction. Included in the technical specifications are criteria for the prevention of air, water, and noise pollution, and of land despoilment from spillage and waste. Prevention of air pollution includes consideration of dust, smoke, fumes, and sprays. Criteria for prevention of water pollution cover spilling fuel, oil, and grease; runoff from concrete operations; and from the use of herbicides and pesticides. Land despoilment considerations include spillage and waste from concrete,

asphalt, and water during operations, and the destruction of land forms and vegetation. Noise pollution as a result of all construction, sediment control, and clearing and grubbing operations are also covered by technical specifications.

SECTION TWO - ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 Physiographic Description of the Region. Three Rivers, Texas, is situated about midway between the Gulf coast and the Balcones escarpment. This is in the middle of the Gulf Coastal Plains physiographic region. The Gulf Coastal Plain of Texas refers to a wide belt of country which trends northeast-southwest between the Gulf of Mexico and the Balcones escarpment and ranges from 140 to 250 miles in width, reaching its maximum width in the Rio Grande embayment. It is characterized by broad rolling to hilly land forms that include landward facing escarpments with wide intervening plains covered with a heavy growth of oaks and brush especially along drainage ways. Some of the areas have been cleared for cropping or pastures. The surface soils of the area are generally considered to be deposits of soil brought down from the upland area inland from the escarpments. The escarpments are supported by erosion resistant rocks, mainly sandstones, and the intervening valleys are developed on softer shales and clays. The escarpments are outstanding geological features, easily visible from west to east, on a line through several counties as steep slopes or, in some places, as rugged cliffs more than a hundred feet high. Above the escarpments, the streams flow through narrow, deeply eroded valleys with steep slopes. The soil here is very thin, underlain with limestone rock, and capable of sustaining only sparse vegetation. Most of the rock formations strike parallel to the general northeast-southwest trend of the Coastal Plain. The southernmost escarpment, known as the Bordas escarpment, traverses Live Oak County and is dissected by the Nueces River at its confluence with the Frio River. The city of Three Rivers is situated on the flat flood plain of the Frio River two miles upstream from this confluence. Gulfward, through the Gulf Coastal Plain region the streams meander down wide valleys with low banks. The soil is deep and supports a good growth of vegetative cover on the gently rolling flood plain.

2.02 Description of the Watershed. This project is somewhat unique in that the city of Three Rivers, Texas, is affected by runoff from three separate watersheds. The city is situated on the left bank of the Frio River about 2 miles downstream from the point where the Atascosa River joins the Frio River. The confluence of the Frio and Nueces Rivers is about 2 miles downstream from the town. High water on any of these streams, singly or in combination, can cause flood damages in Three Rivers. The watersheds near Three Rivers support such diverse agricultural products as cattle, hogs, sorghums, cotton, corn, flax, broomcorn, and peanuts. These products gradually become progressively less important the further upstream you go. The transition is through grain and livestock production to sheep and goat rearing in the headwaters areas. In the flood plains which experience frequent overbank flows and in the sloughs and old oxbows, a thick tangle of liveoaks, bottom land hardwoods, and understory prevail. Native plants existing back and away from the drainage ways include chaparral, small oaks, mesquite, catclaw, huisache, huajillo,

Jerusalem thorn, and many other small trees and shrubs. Most of the land which is not subject to frequent flooding has been converted to cropland and pastureland.

2.03 General Climatic Data. The climate in the vicinity of Three Rivers, Texas, can be generally characterized as being mild with warm summers and cool winters. The average annual temperature there is about 70 degrees, with a normal daily temperature varying from a minimum of about 45 degrees in January to a maximum of about 95 degrees in July. The average length of the growing season, from the last freeze of spring to the first freeze of the fall, is about 290 days. The normal annual precipitation for the area is about 26 inches. The maximum and minimum annual rainfall amounts recorded at the Three Rivers gage were 47.24 inches in 1935 and 13.10 inches in 1956. Some effects of tropically spawned hurricanes have been felt as far inland as the Three Rivers area. The prevailing winds are out of the southeast and average about 8 knots.

2.04 Precipitation. As previously stated, the normal annual precipitation for the area is about 26 inches. The following table gives a month-by-month breakdown of precipitation distribution.

Month	Inches	Month	Inches
Jan	1.47	Jul	1.64
Feb	1.83	Aug	2.07
Mar	1.19	Sep	3.77
Apr	2.16	Oct	2.49
May	3.53	Nov	1.51
Jun	2.51	Dec	1.49

Occasionally, major storm rainfall and extensive and prolonged flooding are the result of hurricanes. On balance, much of the precipitation experienced is concentrated in storms which occur at any time of the year. These storm periods are usually followed by long periods of little or no rainfall.

2.05 Floods. There are four streamflow gages in the general vicinity of Three Rivers which indicate runoff for varying periods of record. The gages are on the Atascosa River at Whitsett, the Frio River at Calliham, and on the Nueces River near Tilden and at Three Rivers. The city of Three Rivers is located in an area which is particularly susceptible to flooding, in that flooding may be produced by storms centered on either the Atascosa River or the Frio River, or from backwater due to storms centered on the Nueces River. The maximum flood of record was experienced on the Nueces, Atascosa, and Frio Rivers near Three Rivers as a result of rainfall produced by Hurricane Beulah in 1967. A list of the major floods with the observed peak discharges follows:

MAJOR FLOODS

Date	Peak discharge, cfs
18 September 1919	85,000
24 February 1923	39,300
31 May 1929	37,900
8 July 1932	56,000
14 September 1932	25,200
15 June 1935	66,700
3 July 1936	28,300
5 May 1941	28,600
19 September 1941	34,400
9 July 1942	55,000
1 September 1946	24,600
13 October 1946	40,700
25 February 1958	56,500
23 September 1967	141,000
22 January 1968	25,600

2.06 Interrelationship of Upstream Reservoirs to Flooding. The Choke Canyon project to be situated on the Nueces River just upstream from Three Rivers contains no designated flood storage. However, if the project is not filled to capacity when a storm of current flood producing capacity occurs, it will be able to impound some runoff and thereby reduce by a small amount the extent of anticipated flooding. The Sabinal project on the Sabinal River, the Concan project on the Frio River, and the Montell project on the Nueces River are all located upstream of the fault zone, and most of the water in these reaches of the rivers will go into the Edwards aquifer and have no effect on the flooding experienced in the Three Rivers area. Although urban damages in Three Rivers may be produced by overflow from the Nueces River, the records at the Three Rivers gage on the Nueces (summarized in the foregoing list) indicate the frequency with which these damages may occur. It can be noted that at least 15 floods have occurred since the beginning of gage records in 1915 which would have produced urban damages in Three Rivers. (On the Nueces River at Three Rivers the estimated standard project flood has a peak discharge of 257,000 cubic feet per second, which is 238,000 cubic feet per second above the channel capacity. Damages begin to occur at a discharge of 22,500 cubic feet per second. The standard project flood is defined on page I-1.)

2.07 Runoff Records. The four gages mentioned in paragraph 2.05 have produced annual runoff data which are summarized in the following table.

Stream	Location	Drainage Area (sq mi)	Period of Record	Annual Runoff* (inches) Min	Avg	Max
Nueces	Tilden	8,192	11/42-9/66	0.03	0.76	1.92
Frio	Calliham	5,491	9/24-4/26 5/32-9/66	0.04	0.60	3.10
Atascosa	Whitsett	1,171	10/24-5/26 6/32-9/66	0.20	1.40	5.35
Nueces	Three Rivers	15,600	7/15-9/66	0.02	0.68	3.00

*Calendar year

2.08 Stream Characteristics. The Atascosa River, the largest tributary of the Frio River, rises in the northwest corner of Atascosa County at approximate elevation 740 msl and flows in a generally southeasterly direction for about 98 miles to its confluence with the Frio River. The stream has a total fall of about 624 feet and an average slope of about 6.4 feet per mile. Its drainage area is 1,441 square miles. The Frio River rises in the northeast corner of Real County at about elevation 2150 msl, flows generally in a southeasterly direction for about 265 miles where it joins the Nueces River. This stream has a total fall of about 2,050 feet and an average slope of about 7.7 feet per mile. Its drainage area, including the Atascosa, is 7,011 square miles. The Nueces River rises in the northwest corner of Real County at about elevation 2200 msl. It flows in a southerly direction for about 146 miles, thence southeasterly for about 125 miles, thence northeasterly for 75 miles to its confluence with the Frio River. This section of the river has a fall of about 2,100 feet with an average slope of about 6.1 feet per mile. The total drainage area above the confluence of the Nueces and Frio Rivers is 15,600 square miles. The Nueces and Frio Rivers have their sources in the rugged Edwards Plateau region above the Balcones escarpment. The streams in this region are generally deeply entrenched in narrow valleys and have steep slopes. Once the stream reaches the Coastal Plain, the slopes decrease and the watercourses meander through broad valleys.

2.09 Water Quality. The chemical quality of water is dictated by the geology and soils through which the stream runs and receives its runoff and by the activities of man which involve uses of the water and certain chemicals which find their way into the streams. Water quality data on each of the three rivers has been collected on a sporadic basis from as early as 1930. Currently, the US Geological Survey maintains sampling stations on the Frio River at Calliham, on the Nueces River near Three Rivers, and on the Nueces River near Mathis. The present quality of water for the area was determined by using the USGS published records from October 1968 through September 1973 for the

three previously mentioned sampling stations. Of the parameters tested, only the dissolved solids, dissolved oxygen, chlorides, sulfates, temperature, and pH have Texas Water Quality Standards given. One set of standards applies to the Nueces River near Mathis, and another set applies to Nueces River near Three Rivers and to Frio River at Calliham. The following three tables give recorded maximum, minimum, and average values for the listed parameters. Those parameters for which standards have been established have the standard value displayed in the tables.

ANALYSIS OF WATER SAMPLES
BY USGS*, FRIO RIVER AT CALLIHAM, TEXAS

	Chemical Analysis in mg/l			
Constituent	Maximum	Minimum	Average	Standard
Discharges (cfs)	26,400.0	.0	653.0	
Silica	28.0	.1	11.9	
Calcium	250.0	17.0	95.0	
Magnesium	80.0	1.1	17.0	
Sodium	1,060.0	.0	213.0	
Sodium and Potassium	660.0	.0	153.0	
Potassium	13.0	.0	7.9	
Bicarbonate	440.0	44.0	191.0	
Carbonate	10.0	.0	1.0	
Sulphate	680.0	7.0	160.0	500.0
Chloride	1,540.0	.7	249.0	650.0
Fluoride	.8	.1	.3	
Nitrate	16.0	.1	1.9	
Dissolved solids	3,320.0	70.0	795.0	2,000.0
Hardness (total)	890.0	47.0	302.0	
(noncarbonate)	682.0	.0	149.0	
Specific conductance	5,750.0	104.0	1,355.0	
pH	8.4	6.5	7.6	6.5-8.5
Temperature (^{o}C)	30.0	10.0	21.8	32.2
Sodium absorption ratio	21.0	.3	4.2	
Fecal coliform				200/100 ml

*USGS samples October 1968 through September 1973.

ANALYSIS OF WATER SAMPLES
BY USGS*, NUECES RIVER NEAR THREE RIVERS

Constituent	Chemical Analysis in mg/l Maximum	Minimum	Average	Standard
Discharges (cfs)	30,200.0	.21	1,716.0	
Silica	40.0	2.50	16.3	
Calcium	260.0	21.00	101.0	
Magnesium	51.0	1.80	18.7	
Sodium and Potassium	53.0	6.60	178.0	
Bicarbonate	508.0	88.00	228.0	
Carbonate	6.0	.00	.01	
Sulphate	420.0	6.00	188.0	300.0
Chloride	940.0	5.00	253.0	700.0
Fluoride	.8	.00	.3	
Organic Nitrogen	.83	.00	.4	
Nitrite	.010	.00	.004	
Ammonia Nitrogen	.21	.00	.1	
Nitrate	3.6	.00	.87	
Phosphorous	.63	.05	.25	
Dissolved solids	2,100.00	103.00	841.00	1,500.0
Hardness	830.0	61.00	325.00	
Sodium absorption ratio	41.00	.30	3.70	
Specific conductance	3,720.00	178.00	1,353.00	
pH	9.00	6.70	7.80	6.5-8.5
Temperature (^{o}C)	32.50	7.50	23.20	32.2
Dissolved oxygen	11.80	5.10	7.90	
BOD	7.60	.80	2.80	
Iron	260.00	.00	30.50	
Fecal coliform				1,000/100 ml

*USGS samples taken October 1968 through September 1973.

ANALYSIS OF WATER SAMPLES
BY USGS*, NUECES RIVER NEAR MATHIS

Constituent	Chemical Analysis in mg/l			
	Maximum	Minimum	Average	Standard
Discharges (cfs)	18,800.0	24.0	1,412.0	
Silica	21.0	.2	15.7	
Calcium	88.0	36.0	59.1	
Magnesium	11.0	2.4	6.3	
Sodium	82.0	16.0	45.0	
Sodium and Potassium	79.0	12.0	49.0	
Potassium	11.0	4.5	7.1	
Bicarbonate	216.0	122.0	174.0	
Carbonate	6.0	.0	.4	
Sulphate	72.0	11.0	40.0	
Chloride	150.0	12.0	62.0	
Fluoride	.4	.1	.2	
Nitrate	1.5	.0	.5	
Dissolved solids	506.0	170.0	318.0	
Hardness (total)	260.0	100.00	172.0	
(noncarbonate)	110.0	0.0	28.0	
Sodium absorption ratio	2.3	.5	1.6	
Specific conductance	912.0	278.0	549.0	
pH	8.3	6.9	7.7	
Temperature (^{o}C)	29.5	6.0	19.6	

*USGS samples October 1968 through September 1973.

The following fecal coliform data has been compiled from the analysis of water samples collected at the bridge on Highway 281 south of the city of Three Rivers.

Date	Fecal Coliform number/100 ml	TWQB Stream Standards
11/13/74	210	200
12/11/75	36	200
12/17/74	0	200
1/29/75	230	200
2/20/75	7,300	200
3/26/75	240	200
4/23/75	21	200
7/21/75	1,400	200
6/11/75	14,000	200

The fecal coliform levels were relatively high on some of the days shown above. The source of these high coliform levels is presently unknown, but may be attributable to the city of Three Rivers' sewage treatment plant. All wastewater discharges are required to have a waste control order or a registration from the Texas Water Quality Board, as well as an NPDES (National Pollutant Discharge Elimination System) permit from the Environmental Protection Agency. These documents place restrictions on the quantity and quality of wastewater that can be released to the receiving stream.

2.10 General Geology. The Coastal Plain is supported by a sequence of sedimentary rock units which dip gently southeast so that successively younger formations crop out gulfward. Immediately south of the Balcones escarpment chalky limestones and clay shales of late Cretaceous age crop out. Farther south, younger formations of Tertiary age are exposed. These are mostly sandstone and clay. From this point to the Gulf of Mexico, younger sandstones, sands, and clays of Quaternary age are exposed. The project area is underlain by the sedimentary rocks of Tertiary age. Major faults are limited to the Balcones fault zone approximately 60 miles to the northwest and the Sam Fordyce-Vanderbilt fault zone which is approximately 45 miles to the southeast. Both fault zones trend in a northeast-southwest direction.

2.11 Stratigraphy. The city of Three Rivers is underlain by sedimentary strata of Tertiary age. Immediately beneath the valley alluvium and comprising the hilly topography bordering the river valley is the Oakville formation of Miocene age. The Oakville formation unconformably overlies the Catahoula formation of Oligocene or Miocene age.

2.12 The Oakville formation in Live Oak County has a reported thickness of 300 feet. It is composed of fluviatile deposits of soft cross-bedded sandstone and ashy or bentonitic clay. Some of the sandstone

beds are sufficiently cemented with calcite and silica to support the Bordas escarpment.

2.13 The Catahoula formation in Live Oak County has a reported thickness of 600 feet. The Catahoula is a series of continental sands, clays, and pyroclastics interbedded with fluviatile sediments. A distinguishing characteristic of the formation is a preponderance of pyroclastic materials such as tuff and volcanic ash.

2.14 Soils. Five auger borings were drilled in the flood plain along the proposed levee alignment. The deepest of these was 30 feet and did not penetrate the total thickness of the valley alluvium. The material encountered consisted of clay and fine sand. The hills bordering the river valley are covered with a mantle of residual and colluvial soil. Scattered gravel deposits occur on the high divides and in terraces along the Frio River.

2.15 Construction Materials. Locally abundant materials suitable for use in construction are limited primarily to alluvial soils and scattered gravel deposits. This type of soil is well suited for embankment and similar purposes. The gravel is suitable for roadway and concrete aggregate uses.

2.16 Ground Water. The Oakville formation, which is the supporting bedrock of the Three Rivers area, is a major aquifer in southern Texas. The fresh water that occurs in the formation is derived mostly from precipitation or seepage from streams on the outcrop area. In the outcrop area the water occurs under water table conditions. As the water moves slowly down dip in the formation, it occurs under artisian conditions because the Oakville and Catahoula formations are underlain and overlain by relatively impermeable clays. Municipalities drawing water under artesian conditions from the Oakville formation include: Cuero, Yorktown, Nordheim, Runge, Kenedy, Pettus, and George West. In the outcrop area of the Oakville formation very little ground water suitable for public supply is available. All towns within this area use surface water for their water supply.

2.17 Economic Geology. Mineral resources found in Live Oak County include barite, sand and gravel, drilling mud, uranium minerals, and volcanic ash. Of these, sand and gravel and uranium minerals have been reported near the city of Three Rivers. There are small gravel pits surrounding the city at higher elevations and occurring in terrace deposits bordering the flood plain. Excavation may encounter terrace deposits of sand and gravel. Petroleum, natural gas, and natural gas liquids are produced and refined in the Three Rivers area. Uranium mineral prospects from beds in the Oakville formations have been reported from north of Oakville and east of George West. No prospects have been reported in the vicinity of Three Rivers.

2.18 Biotic Setting. Dice (1943) places Live Oak County, Texas, in the Texan biotic province. He characterized it as having "the intermingling of prairies and of groves and strips of deciduous trees."

He further characterizes it as an area of "gently rolling plains" with oak and hickory on sandy soils and prairie on the heavier soils. The winters here are mild and of short duration. The summers are long and hot. Rainfall is more abundant during the long growing season. There are abundant perennial flowering plants and the prairies are dominated by various grasses. Live Oak County was named for the predominant tree growing in the area. Other predominant trees are post oak, blackjack oak, and Texas hickory. Blair (1950), on the other hand, places the Live Oak County area in the Tamaulipan biotic province. He uses the Balcones fault line for his northern boundary. Blair characterizes the area as being semiarid (which fits with the 27 inches of annual precipitation) and megathermal (which fits with the long hot summers). He states that thorny brush is the predominant vegetation type with the most important being mesquite, chapparral, soap-bush, Texas silverleaf, white brush, prickly pear, tosajillo, Condalia spp, Allthorn castela, and several species of Acacia and Mimosa. The northern part of the province which is drained by the Nueces and its tributaries has flood plains with a well developed live oak forest. Among these and other plant life can be found some 61 species of mammals, 36 species of snakes, 19 species of lizards, 2 species of land turtles, 3 species of salamanders, and 19 species of frogs and toads. Thus Blair's description fits the observed characteristics of the Three Rivers area.

2.19 Flora. Originally, the vegetation of the project area consisted of perennial warm season bunchgrasses in post oak, live oak, and mesquite savannahs. The dominant grasses were primarily longspike silver bluestem, Arizona cottontop, buffalograss, curly mesquite, and several species of Setaria, Pappophorum, and Bouteloua. Because of the pressures of long and intensive grazing, the plant communities have been altered to a point where ranchers now have a severe brush invasion problem. These brush-type invaders include mesquite, post and live oak, cacti, and several species of acacias. Along the drainage ways such as the normal river flood plains, old oxbows, and sloughs can be found huge elm, hackberry, willow, sycamore, and ash trees. Other species of trees are also plentiful, as well as the diverse tangle of understory plants. None of these trees are listed in the National and State Champion Tree Register.

2.20 Fauna. Overall, major wildlife species are scarce in and adjacent to the study area. However, of all the native species of mammals listed by Davis (1966), about one-third of them have a range which includes Live Oak County. Raun and Gehlbach (1972) list the location and occurrence of 104 species of amphibians and reptiles in Texas, of which 39 species occurring in Live Oak County have either been collected by the authors or referenced in other literature. Raun and Gehlbach (1972) show 2 of their 39 species to be poisonous, and Werler (1970) believes that there are 4 species of poisonous snakes native to the area. The species of fish known to inhabit the Frio River at Tips State Park number 15. Of these, 7 can be classified as sport type fish. According to Oberholser (1925), the type of vegetation in what he calls the "Southern Brush Association" forms

one of the most attractive places for birds to be found in the state. He lists 116 species and subspecies which can be found here exclusive of stream valleys and open grassy tracts. Surely the list would be even more extensive if the excluded areas were included. Oberholser et al. (1974) lists 26 species and subspecies of birds which are considered characteristic of the "South Texas Brush Country."

2.21 Rare and Endangered Species. For a long time only vertebrate fauna was accorded any amount of concern that some species had populations which were nearing a point where they were in danger of not being able to reproduce enough offspring to continue the existence of the species. Only recently have attempts been made to include certain other members of the animal kingdom and some members of the plant kingdom. Of the mammals whose range either is or was included in the Three Rivers area is the red wolf. The alligator is the only endangered reptile known to have its range within the subject area. There are no known species of birds resident to the area that are endangered; however, the whooping crane and Attwater's greater prairie chicken may have once claimed the area as part of their natural range. It is also possible that some southern bald eagles may occasionally visit the area. Culbertson and Schmidly (1974) indicate that the short-tailed shrew and yellow bat are peripheral in Texas, the red wolf is endangered, and the cougar and ocelot are rare. They hold to the now abandoned three class classification system to indicate the relative status of each species. None of the plant species growing in or around the area are known to be endangered. However, some 68 species of plants known to be found in the local vegetational area are being given consideration for protection. Data relative to the status of invertebrates is not available.

2.22 Esthetic Appeal. The area in the vicinity of the city of Three Rivers, Texas, is situated in the middle of the vast Gulf Coast plains. These plains are characterized by miles and miles of low rolling terrain. The primary change of terrain occurs at the major waterways, i.e., the Frio, Nueces, and Atascosa Rivers. The difference here is the amount of change of elevation in relation to the distance horizontally and the change in size, density, and species of vegetation. For someone who is accustomed to the "majestic grandeur" of mountainous areas or of the great eroded areas such as the Grand Canyon, the Three Rivers area is esthetically uneventful. However, for those to whom the prairie is "home" or for those who have come to appreciate its unique character, it is "the place to be."

2.23 Historical Perspective. In the spring of 1913, a young man who had just graduated from Texas University and was unhappy with working in a bank in Seguin came to the area in Live Oak County where the three rivers - Atascosa, Frio, Nueces - flow together. The rich valley lands intrigued Charles R. Tips. He was able to organize a land company and buy a sizable acreage adjacent to the Frio River where the Atascosa River flows in from the Hamilton ranch. Having a townsite

surveyed, a land sale held, and the other business matters attended to, Mr. Tips went about seeking industry for the area other than cotton farming and cotton ginning.

2.24 The community was originally named Hamiltonburg, but by 1 May 1914, the US Postal Department had changed it to Three Rivers to avoid confusing it with Hamilton, Texas.

2.25 The bank established - First State Bank - is one of the few which has never closed because of economic conditions (i.e., the depression of the 1930's). A glass factory was built in the area and enjoyed success for a period. Eventually it was sold to the Ball Corporation who subsequently closed the plant. Oil refining was started in the 1940's and has continued on a small scale. On 23 June 1975, the Sigmor Corporation opened a rebuilt refinery there worth several million dollars.

2.26 Population figures for the community have fluctuated often, resulting from events such as the glass factory opening and then closing, floods, droughts, and wartime work in San Antonio. Present population is slightly less than 2,000 because many people moved out of the flood prone area within the city limits to a high area (the hill) just outside of the northern city limits as an aftermath of the flooding caused by Hurricane Beulah in September of 1967. (16)

2.27 Listed Historical and Archeological Places. The National Register of Historic Places does not list a single place in Three Rivers, or even Live Oak County, which is considered to have national or regional significance. The Guide to Official Texas Historical Markers compiled by the Texas State Historical Survey Committee and revised in 1971 lists two historical markers of state significance. One is mounted on the First State Bank and the other is in the rose garden of the city hall. Both markers relate to events or places relating to Colonel Charles R. Tips, the founder of the city of Three Rivers. There now are records of nine archeological sites located in the vicinity of Three Rivers, resulting from a recent survey. Coordination with the State and Federal historical and archeological agencies was accomplished by letter at the initiation of the project study in May 1975.

2.28 Archeological Reconnaissance. From 30 August to 5 September 1975, an archeological survey in the vicinity of Three Rivers was conducted by a field archeologist from the University of Texas at Austin. The survey disclosed the existence of nine archeological (prehistoric) sites, of which five appear to be potentially significant resource areas.

2.29 Population. In 1970, Live Oak County had a population of 6,697 residents, which represents a decrease of 14.6 percent from the 7,846 counted in 1960. This decrease is more pronounced than that experienced by the city of Three Rivers. From 1960 to 1970 the city

had about a nine percent decrease when the population declined from 1,932 to 1,761 residents. (13)

2.30 Ethnic Composition. Of the 6,652 white county residents, 40.7 percent, or 2,706, are considered to be of Spanish heritage. This leaves 45 residents, of which 29 are Negro, 3 are Indian, and 13 of other races. (14) The city of Three Rivers has a total population of 1,761, of which 8 are Negro and other races. The remaining 1,753 are considered to be white and includes those of Spanish surname. (15)

2.31 Employment. The total labor force of Live Oak County consisted of 2,197 persons in 1970, of which about 34 percent were classified as "white collar" by the Bureau of the Census. This percentage is somewhat below the national average for nonmetropolitan counties (38.5 percent). The labor force of "Spanish surname and/or Spanish language descent" in Live Oak County consists of 530 persons, or about 24 percent of the total. Employment is found in the oil activities and agribusiness which are important sectors of the area's economy, and in commercial and service industries.

2.32 Real Income Per Capita. The per capita income in 1969 for Live Oak County was determined to be $2,038. This is slightly better than $1,993 determined for the "average United States non-metropolitan statistical area." To a considerable degree, socio-economic characteristics of Live Oak County appear to reflect similar conditions in the city of Three Rivers.

2.33 Taxation. In 1972 the county tax rate for all Texas counties varied from a high of $2.85 per $100 valuation to a low of $0.70. The county tax rate in Live Oak County was $0.95. In the same year, Three Rivers had a city tax rate of $1.50 per $100 assessed valuation which is comparable with many Texas cities. The state sales taxes collected in Three Rivers in 1972 netted $21,929, or $12.46 per capita.

2.34 Education. The estimated educational attainment for citizens of Live Oak County is that 31.5 percent have completed high school or more advanced education. This is about 14 percent below the national average. Students taking the Scholastic Aptitude Test (SAT) in Three Rivers have recently averaged about 900, while the national average was about 800. This would indicate that the quality of education in the Three Rivers school system surpasses that of the nation as a whole.

2.35 Public School. The public school in Three Rivers is administered by the Three Rivers Independent School District. The school system contains kindergarten through the twelfth grade. This system is divided into the grade school, which includes kindergarten through the sixth grade; junior high school, which includes the seventh and eighth grades; and high school, which includes the ninth through twelfth grades. Each grade has at least two classrooms. There is a total of 16 buildings in the school campus complex utilized by 550 students. The newest building in the complex is about 18 years

old. As of 1975, the school had a teacher-student ratio of 1 to 21 overall, and 1 to 14 in the high school. About 42 percent of the student body is Spanish surnamed. (21)

2.36 Housing. Information obtained during the 1970 census indicates that the adequacy of housing in Three Rivers is substantially lower than the average for the other nonmetropolitan counties in the United States.

2.37 Roads. The community is served by US Highway 281 and State Highway 72. The 1965 survey traffic count of the Department of Highways and Public Transportation revealed that vehicle traffic through Three Rivers averaged 3,350 per day. The 1975 figures indicate the traffic count through the community averages 4,565 per day. (17) Recent improvements in nearby portions of the state roadway network have probably diverted some traffic around the community.

2.38 Railroad. The town is served by the Missouri-Pacific railroad.

2.39 Bus. Daily bus service is provided by Continental Trailways bus.

2.40 Agricultural Trends. Three Rivers is a trade center for ranching and farming. According to census data, employment in the category, "agriculture, forestry, and fisheries," has trended as follows:

Year	Number of Employees	Percent of Labor Force
1940	1,891	62.6
1950	1,478	47.6
1960	785	32.3
1970	433	20.9 (18)

2.41 The agricultural employment in Live Oak County has steadily declined even though the number of acres of cropland harvested in the county increased from 79,400 in 1940 to 84,290 acres in 1970. (19)(20)

2.42 Land Use. Existing structural development in Three Rivers falls within the flood plain area and higher elevations in the northeast section of town. The major part of new residential development has taken place in the northeast section. This trend is expected to continue. The business district is expected to remain concentrated in the downtown area, even though it is susceptible to flooding. Land suitable for development inside the city consists of vacant lots in the business and residential areas, and land now in agricultural production. Most commercial development is in the central business district located adjacent to the intersection of US Highway 281 and State Highway 72 and east of the Missouri-Pacific railroad. The agricultural areas are northwest and east of the business district. The school occupies several blocks in the southeast corner of the community. Olds Slough, a natural overflow waterway, is an unoccupied

land area which separates the main part of the community from the higher area now being more intensively developed in the most northern part of the city. Tips State Park occupies 31 acres of the city area and is situated on the west side of the Frio River. The water treatment and wastewater treatment facilities also occupy some of the city land area.

2.43 Existing Recreation Opportunities. The 31-acre Tips State Park is located adjacent to Texas State Highway 72 and on the right bank (west side) of the Frio River. Camping, fishing, and picnicking are permitted in the park. The park is not well developed but receives moderate usage.

2.44 Future Environmental Setting. With most of the best agricultural land now applied to its best use, there is little likelihood that types of use will change. Commercial mineral extraction will continue but will be of such a small scale it will cause a very small change in the vista of the region. The area in the immediate vicinity of the city of Three Rivers is expected to experience a very slow rate of growth. This is based on projections by the Bureau of Economic Analysis, a division of the Department of Commerce. Live Oak County is part of the Bureau's Economic Area 143 (see plate 2). The projections for Economic Area 143 are displayed in table II-1. The local growth will most likely occur primarily in the northern part of the city where land elevations are above the 100-year flood plain. Most of the growth will be directed to the north because financing of new building and remodeling are restricted by ordinance to areas or buildings which are or will be situated at least one foot above the 100-year flood elevation. Individually, families or organizations who own houses or other buildings in the area of the city which has an elevation below the 100-year flood elevation and who must borrow money to maintain them will most likely permit the facilities to deteriorate to a point of being nonusable. In some instances, the facilities may be made flood proof and thereby increase their longevity. Overall, the current trends of the area will continue with minor adjustments being made to compensate for actual and anticipated damages from floods.

TABLE II-1

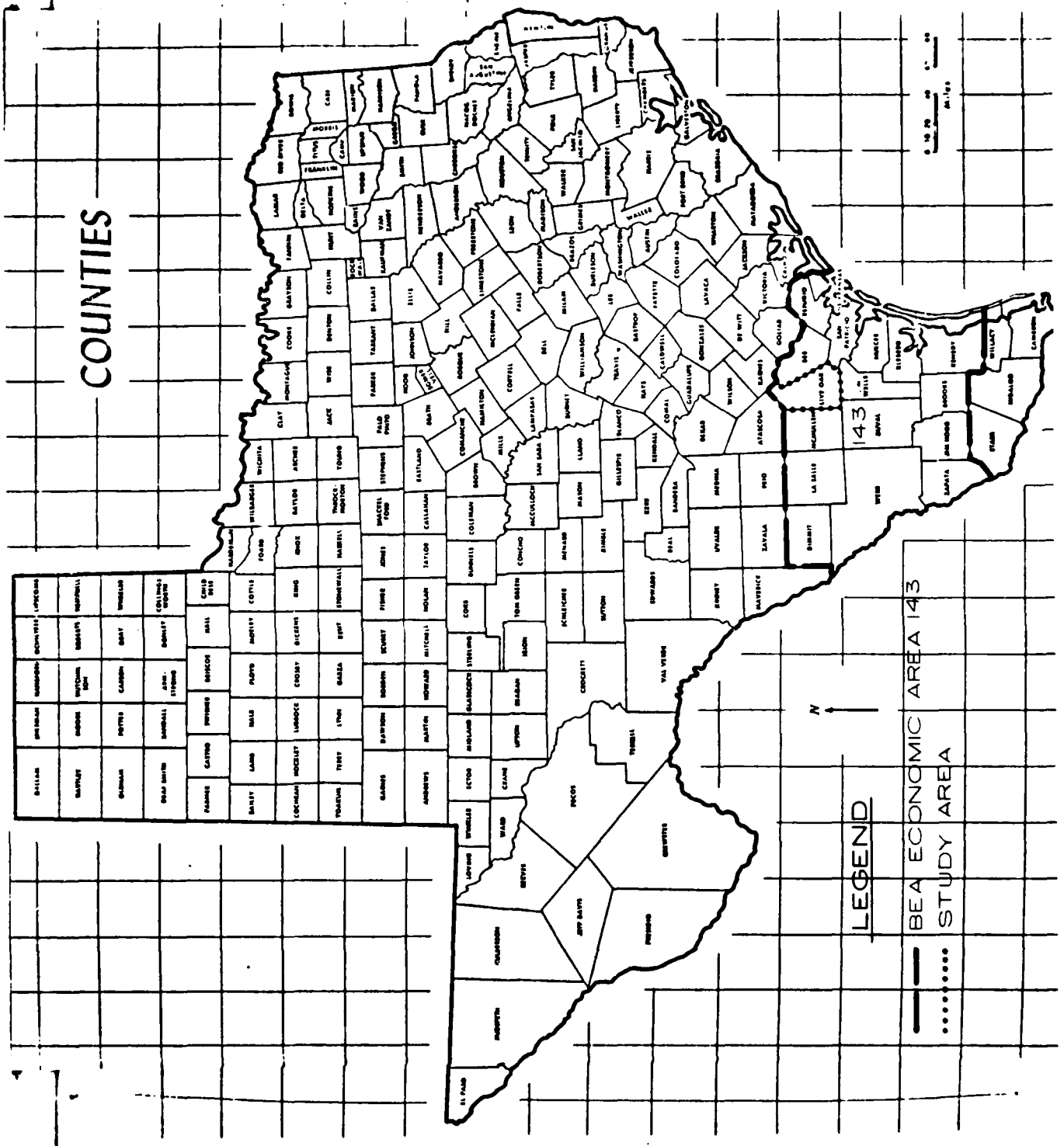
PROJECTION SUMMARY FOR BEA ECONOMIC AREA 143

Indicator	1970	1980	2000	2020
Population	516,278	539,900	597,800	672,900
Per capita income (1967 $)	2,497 1/	3,496	6,371	11,417
Employment	172,240 2/	183,200	207,100	238,800
Manufacturing (thousands of 1967 $)	107,735	161,000	334,200	696,800
Agriculture (thousands of 1967 $)	81,185	87,500	120,000	210,100
Construction (thousands of 1967 $)	69,473	96,400	187,700	366,200

1/ 1969 $

2/ Interpolated

SOURCE: Volume 2, OBERS Projections, Series C, 1972



ECONOMIC AREA 143
BUREAU OF ECONOMIC ANALYSIS, DEPARTMENT OF COMMERCE

Plate 2

SECTION THREE - RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 General. Because of the diversity of land uses now occurring throughout the United States, and since many of the uses or change of uses are planned or sponsored by one or several governmental agencies, it has become necessary for interagency coordination of land use plans so that agencies do not negate or interfere with other agencies' land use programs. This is designed to provide a reasonable and orderly use of the nation's lands.

3.02 Comments on Land Use Plans. On 19 May 1975, the following agencies were furnished a map of the proposed project and requested to inform the Fort Worth District, Corps of Engineers, if the proposed project would conform or conflict with any other known planned uses of the area. Those preceded with an asterisk have replied to the letter of request.

*Bureau of Reclamation, Austin, Texas
*Bureau of Outdoor Recreation, Albuquerque, New Mexico
*Environmental Protection Agency, Dallas, Texas
*Soil Conservation Service, Temple, Texas
*National Park Service, Santa Fe, New Mexico
*Office of the Governor, Austin, Texas
Coastal Bend Council of Governments, Corpus Christi, Texas
Mayor, Three Rivers, Texas

3.03 The replies acknowledged no outright land use conflicts. However, the Corps was encouraged by some of the agencies to protect certain features of interest or concern to them.

SECTION FOUR - THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.01 Hydrological Elements. It is the design purpose of the proposed project to affect the hydraulic elements of the project (i.e., to re-route floodflows around or away from the developed flood prone area of the city of Three Rivers, Texas). The supply and quality of water will not be increased nor decreased but will remain essentially as that now being experienced. Thus the main impact expected to occur to the hydraulic elements is the routing of excessive Frio River flows around the city of Three Rivers. Olds Slough will no longer carry flows during floods but will serve as a sump area and will flow only when emptying after the flood peak has passed on the Nueces.

4.02 Geological Elements. The geological elements to be impacted by the project will be limited almost solely to the lands required for siting the levee and areas for borrowing materials for building the levee. An estimated 103 acres will be needed for levee right-of-way. About one-third of this is dedicated to row crops, one-half is utilized for pasture, and the remainder is in native brushy vegetation except for a very small area in residential development. An additional 67.1 acres will be dedicated to borrow areas. Location of borrow areas will be determined by subsequent studies. The project is estimated to require a total of 813,200 cubic yards of suitable earth materials for the levee. This material will come from excavation of Olds Slough, interior drainage ditches, and borrow pits. The work areas have no aquifers which will be affected nor are there any commercially valuable geological products which will be lost. The portion of silt load which normally settles out when floodwaters spread over flood plain lands will no longer be available to naturally replenish fertility and lost topsoil inside the levee. Barring any heavy precipitation during construction of the levee, there should be no unusual siltation problems downstream from the construction site. Lake Corpus Christi, therefore, would not normally receive any additional sediment load.

4.03 Biological Elements. Any construction project which encompasses the number of acres this proposed project does will cause some imbalance in the immediate ecosystem. Normally the imbalance caused by a small local flood protection project will be of short duration. The imbalances can be categorized into stream alteration, vegetational changes, and fish and wildlife changes. In addition to imbalance caused by levee construction, there will be some disturbance in the area of Olds Slough where excavation and grading will cause loss of existing plant life and associated animals. The area will be sodded, seeded, and/or landscaped in a manner that will not impede the designed hydraulic elements.

4.03A Stream Alteration. This project has been designed so that no part of the natural stream will need alteration.

4.03B Vegetation. Construction of the levee and removal of material from borrow areas will result in the loss of vegetation on the site

of these structures and activities. The area to be disturbed will include the following as a minimum.

Levee right-of-way	103.1 acres
Relocations (railroad - 2.7 acres)	6.5 acres
Borrow areas	67.1 acres
Total	176.7 acres

4.03C Vegetation which will be established on the levee would restore some of the disturbed area to usable for some species of wildlife. Those lands located inside of the proposed levee, now useful to some species of wildlife, will likely be cleared of vegetation and developed for commercial and residential use because of the reduction in flood damage potential.

4.03D Fish and Wildlife. If the three borrow pits are left with uneven bottoms and some brush shelters provided, then they could be stocked with sport fish and thus become another source for sport fishing. The local sponsors are considering the supporting of such use of the pits, and a decision about implementation will be made after additional studies are completed. As stated in the previous paragraph, a minimum of 176.7 acres of terrestrial habitat will be disturbed. The 103.1 acres of levee right-of-way will return to use for terrestrial species. Some of the 6.5 acres ascribed to relocations will become useful to wildlife. The borrow areas if developed for sport fishing will become useful to aquatic oriented terrestrial species, as well as a resting area for some water fowl. In summary, the project should improve the area fishery and only slightly degrade the wildlife habitat.

4.04 Pollutional Elements. The project area is in the center of a vast agricultural region. Thus, there is little background air, water, and noise pollution. The construction period should create a very localized slight increase in the levels of air, water, and noise pollution. More specifically, the heavy construction machinery will cause increased vehicular emissions from internal combustion engines; the disturbance of ground cover may cause increased levels of dust in the air which will be controlled by watering; and increased loads of sediment in the streams may be experienced if periods of heavy rainfall occur during construction. Noise from the heavy equipment will be evident to area residents. The local school is the only noise sensitive receptor located in proximity to the project work area. Conditions are written into the construction contract to reduce the construction related pollution levels to points which are reasonable. The project itself should have no long term effect on the levels of air and noise pollution in the area unless people with offroad recreation vehicles are permitted to use the slopes developed on the levee. In summary, the existing levels of pollutional elements will not be permanently affected by the project, and temporarily increased levels to be experienced during construction will be held within reasonable levels where possible.

4.05 Historical and Archeological Elements. An archeological survey of the proposed project area was conducted 30 August-5 September 1975. Of the nine sites discovered, five have the potential of being significant resource areas. All of these will be affected to varying degrees by the project. At this early stage of planning, the final alignment of the levee has not been determined, a fact which has direct bearing on mitigation. Every effort will be made to preserve or salvage affected sites prior to construction of the proposed project.

4.06 Social, Cultural, and Economic Elements. Under conditions of the standard project flood an estimated 453 homes, 20 public housing units, and 63 commercial establishments are now subject to flooding. The proposed project would protect 40 percent of the residential property, 30 percent of the commercial property, 10 percent of the industrial property, and 20 percent of the other types of property. About 176.7 acres will be converted from current uses to project related uses. There will be displacements or relocations of 12 residences, 8 of which are occupied. No business or other establishments would be affected. It is expected that there will be some economic stimulation to the community during the construction phase of the project. Property values in the community have been depreciated from floods, the threat of future floods, and flood related building restrictions. With the protection offered by the project, the adequacy of housing and other property will be improved. Also, the local tax base and public services will be enhanced. This, in turn, will lead to improvements in the health, education, and general welfare of society. Community cohesion may occur if the citizens of the community band together to support the project; however, existing cohesion may be dissolved when there are diverse opinions on the merits of alternative ways of financing the local sponsor's share of the cost of the project. In summary, the social, cultural, and economic elements of the community will generally be improved if the proposed project is constructed.

4.07 Esthetic Elements. The area in which Three Rivers, Texas, is located is not considered to have unique or critical type esthetic elements. Therefore, the primary impact from building an 18 feet tall earthen "wall" around three-fourths of the city is the impeding of long range and wide vistas. To help offset this adverse impact, landscaping treatment will be applied to the levee to soften its basic stark lines by blending them into the surroundings via vegetation.

4.08 Flood Effects. Many of the aspects of flooding in the city of Three Rivers have been discussed in paragraph 4.06, Social, Cultural, and Economic Elements. The effect of the standard project flood (SPF) (see page I-1 for definition of SPF) on property and mental outlook with the project completed will be negligible. The interior drainage (inside the levee system) will be such that no damage is expected to occur from interior flooding of magnitudes less than the 50-year frequency flood. The water treatment and wastewater treatment facilities will be located inside the levee system behind floodwalls,

thus preventing damage caused by silt and debris. The SPF will cause some shallow flooding to agricultural lands located west of the Frio River channel and north of State Highway 72. The monetary value of these SPF damages under the "with project" condition is insignificant when evaluated on an average annual basis. The following tabulation displays the expected change in water surface elevations (msl) resulting from the project.

	Water surface (msl)			
	50-year flood		SPF	
Location	Existing Conditions	Improved Conditions	Existing Conditions	Improved Conditions
Three Rivers gage	147.8	148.0	153.7	154.3
Mouth of Frio River	148.3	148.4	153.8	154.4
State Highway 72	151.1	151.1	154.6	155.9
Frio River near confluence with Atascosa River	155.2	155.6	157.8	158.7

The following tabulation displays the expected change in water surface elevations (msl) at the upstream side of the two highway bridges (State Highway 72 and US Highway 281) resulting from the project.

	50-year flood		100-year flood		SPF	
	Existing Conditions	Improved Conditions	Existing Conditions	Improved Conditions	Existing Conditions	Improved Conditions
			State Highway 72			
Elevation	150.7	150.1	152.3	152.0	154.6	155.6
Channel velocity (ft/sec)	8.2	11.5	7.4	10.7	5.3	6.3
Maximum overbank velocity (ft/sec)	2.2	3.0	2.0	2.9	1.5	1.7
			US Highway 281			
Elevation	146.7	146.6	148.5	148.4	153.1	153.4
Channel velocity (ft/sec)	7.4	7.9	8.9	9.6	16.3	17.1
Maximum overbank velocity (ft/sec)	3.1	3.3	3.9	4.2	3.5	3.7

As can be seen in the foregoing tabulations, the project has a minimal effect on US Highway 281. The project has a more pronounced effect on State Highway 72 with a 1 foot increase in water surface elevation for the SPF and noticeable velocity increases for the 50-year, 100-year, and SPF floods. The possible need for riprap to protect against these higher velocities is recognized, and measures will be taken to implement this protection.

In summary, the city will be spared the problem of flood damage, but some adjacent lands will be subjected to infrequent residual flooding, and there will be some additional flow under area bridges from the SPF.

4.09 Recreational Elements. Because Tips State Park will be outside the levee, it will be subject to the annual or periodic floods which may have been a deterrent to full park development. It is also possible that at some future date a system of hiking and biking trails can be developed on the crest of the levees. In summary, the project may have a future enhancing effect on the recreation elements of the community.

4.10 Programs of Other Agencies. The project will enhance the chances of initiating programs of other agencies because of the protected area. Programs of agencies such as the Department of Housing and Urban Development, Bureau of Outdoor Recreation, Environmental Protection Agency, and various State agencies may be applied for and if received, the social, cultural, and economic levels of the community could be bettered. In summary, the constructing of the project could cause the upgrading of the whole community. There are no programs of other agencies which conflict with the constructing of the proposed project.

SECTION FIVE - ANY PROBABLY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01 Geological Elements and Land Uses. The soils excavated for use in the levee will no longer be available for agricultural production. This applies, not only to the levee but also to the borrow areas. The borrow areas will be useful for few purposes other than fish and wildlife (i.e., recreation).

5.02 Biological Elements. The plants and animals which inhabit the area of the borrow pits and the levee site will be displaced. The borrow areas could become fish "ponds" and waterfowl resting areas if the local sponsors decide that such use is feasible. The levee, once vegetation has become established on it, will provide some habitat for small animals and some species of plants.

5.03 Pollutional Elements. The project will create temporary stream, air, and noise pollution during the construction phase. Measures will be taken to keep increased levels at reasonable levels.

5.04 Historical and Archeological Elements. The levee as now aligned will directly adversely affect two archeological sites believed to be potentially significant resource areas and one site believed to be of low archeological value. Another potentially significant site is located in the area of a proposed borrow area. The five potentially significant sites will be excavated, preserved, or left unaffected by the levee to comply with provisions of PL 93-291. Thorough testing and analysis of the sites will require about three months and will cost approximately $6,000. Results of testing and analysis will determine further mitigation. Furthermore, the final alignment of the levee and location of borrow pits have not been determined. One significant site is located in a proposed borrow pit, and relocating the pit would save this site. The levee could be constructed directly over many of the sites without damage if these specific areas are exempted from scraping and leveling. The sites appear to be deep enough to prevent destruction by construction activities, thereby preserving them for future archeological investigation. Sites located between the levee and the Frio River will still be subject to periods of flooding and silt deposition. Any additional sites discovered during construction will be called to the attention of appropriate authorities.

5.05 Social, Cultural, and Economic Elements. If there is a sizable influx of construction labor, there may be some disruption of the community's social pattern during the construction phase. A temporary increase in local spending may occur causing businesses to increase inventories which may not be depleted by the time the construction phase is completed, leaving merchants with excess inventory. Eight of the 12 houses to be relocated are occupied. The property owners and occupants will be justly compensated under the provisions of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Public Law 91-646).

5.06 Esthetic Elements. The levee will be visible but through judicious use of landscaping treatment, it will be less of an adverse visual impact than it would without the softening effect of vegetation.

SECTION SIX - ALTERNATIVES TO THE PROPOSED ACTION

6.01 General. The primary objective of this study was to determine a method of alleviating flooding in the city of Three Rivers, Texas, which would accomplish the objective and still be within the ability of the citizenry to finance their share of the cost of the project. One of the more unique aspects of this study is that nearly the entire community is located in the 100-year flood plain of the Frio River. In order to arrive at the least expensive project which would provide the maximum amount of protection, a group of possible alternative methods was evaluated. All estimates were made by using the Engineering News-Record index to update the project document July 1969 price level. The following paragraphs discuss the methods studied.

6.02 Reservoir Flood Control. The Choke Canyon dam site (see paragraph 1.08) is the best site for an embankment to impound a substantial quantity of water. This site is to be developed by the Department of the Interior, Bureau of Reclamation, for the city of Corpus Christi, Texas. The principal purpose of the Choke Canyon project is to provide municipal and industrial water, recreation, and fish and wildlife enhancement for the Coastal Bend region. Knowing this, the Corps of Engineers studied the cost of modifying the Choke Canyon embankment so that the project would be capable of flood pool storage. Preliminary cost studies clearly demonstrated that any Choke Canyon modification could not economically control flooding in Three Rivers. Further studies showed that additional reservoirs or even a reservoir system could not economically control flooding in Three Rivers. A flood control project providing 50-year frequency flood storage in Choke Canyon Reservoir, plus detention dams on the Nueces and Atascosa Rivers, would have a total estimated first cost and annual charges of approximately $76,050,000 and $4,479,000, respectively. Considering the $296,100 existing annual benefits from flood prevention in Three Rivers only for the period 1975-2075 an overall benefit-cost ratio of about 0.07 would be shown.

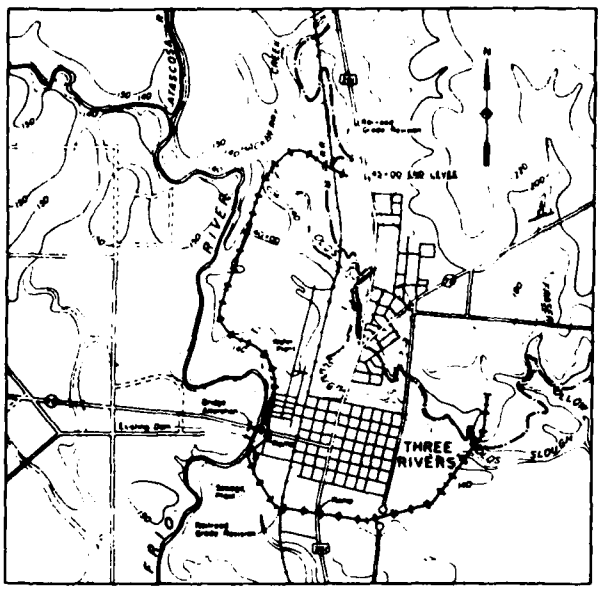
6.03 Improved Channels. Studies were made of the possibility of widening and straightening the existing Frio and Nueces Rivers channels in the vicinity of Three Rivers. Due to the relatively concentrated area of flood damages in the immediate vicinity of Three Rivers, an improved channel with a much greater capacity than that of the Nueces River would have to extend far downstream of this area to appreciably lower the water surface profile. Preliminary cost considerations clearly indicated that an improved channel system was not economically feasible for flood protection at Three Rivers. First costs and annual charges would be $19,281,000 and $1,135,600, respectively, and existing annual benefits would be $296,100 for a 50-year frequency flood protection channel. The overall benefit-cost ratio of about 0.26 would be shown.

6.04 Flood Proofing. Flood proofing involves such measures as shielding or closing of openings, anchorage of foundations to prevent floatation, reinforcement of walls to withstand horizontal pressures

exerted by floodwaters, and measures to cope with sewer backup and ground water seepage. The majority of residences in Three Rivers are frame buildings and do not readily lend themselves to flood proofing because the construction materials do not impede the passage of water. Studies indicated that existing structures located in the flood prone areas of the community are generally adaptable for flood proofing by raising them in place a minimum of six feet. Flood proofing the nearly 675 buildings located in the flood plain would be further complicated by the high flood stages and long durations usually experienced in Three Rivers. Flood proofing would not prevent costly disruption of commerce or the inconvenience associated with evacuation of families, disruption of commerce, or the inconveniences associated with flooded streets and highways. The cost of this approach would be borne 80 percent by Federal funds and 20 percent by local interests funds. Since this approach would not correct the conditions which have caused the withdrawal of Federal support to lending agencies providing loans for construction or improvement of buildings in areas which are not at least one foot above the 100-year flood elevation, it was not considered to be a viable alternative.

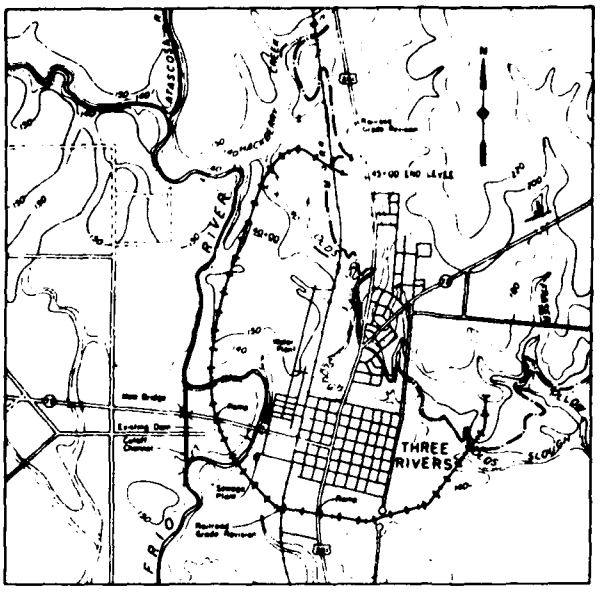
6.05 Permanent Evacuation of the Three Rivers Area. Floodprone lands within the corporate limits of Three Rivers could be regulated by purchase of either title or easements. Preliminary economic analysis showed that it is impractical to acquire presently developed land for the purpose of moving present developments out of the flood plain. The approximate cost of this program would be the value of property in the flood plain less the salvage and retained value. The annual charge for this capital expense is based on 100-year amortization at 6.125 percent interest rate. The benefit from this alternative would be equal to the current annual damage and would be considerably less than the annual charge presented previously. The abandonment of the entire area does not present a practical solution; however, the natural process of attrition has occurred in the past and may, in some instances, follow future floods. The Resettlement Administration instigated a housing project southeast of Three Rivers which suffered from flooding in 1935 and was abandoned after the flood of 1942. Based on these considerations, permanent evacuation of the Three Rivers area was not found to be a reasonable alternative to structural flood damage reduction measures.

6.06 Levee System (Includes Selected Project). Three levee schemes, as shown on plate 3, were studied which would prevent floodwaters entering the city of Three Rivers, Texas. The major difference between the three plans was the levee alignment in the vicinity of Tips State Park, the city sewage disposal plant, and water treatment plant. All three prevented approximately the same flood damages. During preparation of the survey report, levee alignment 2 was the most economical and was recommended for authorization. However, during the phase I review, levee alignment 1, with the levee entirely on the east side of the Frio River, proved to be the least costly and has gained



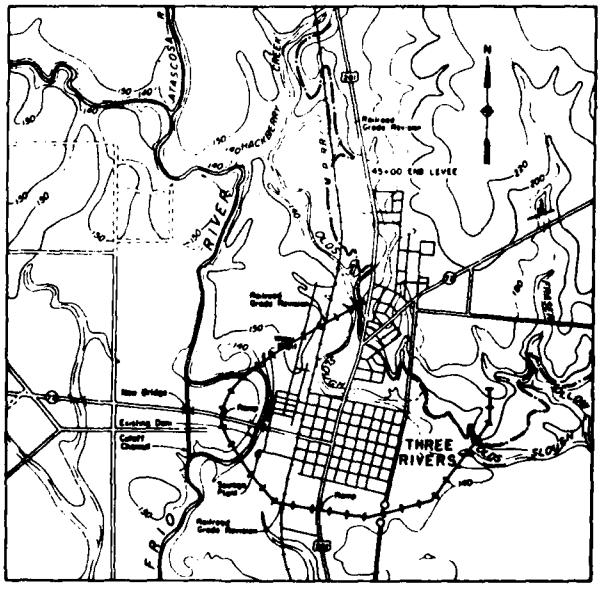
LEVEE PLAN 1

SCALE 1 INCH = 2000 FEET



LEVEE PLAN 2

SCALE 1 INCH = 2000 FEET



LEVEE PLAN 3

SCALE 1 INCH = 2000 FEET

U S ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

ALTERNATE LEVEE PLANS

THREE RIVERS, TEXAS

PLATE 3

the support of the majority of the inhabitants of Three Rivers. This plan (levee plan 1) would require piping sewage effluent through or over the levee to the lower Frio River, outside the protected area. The area to be protected by the levee has considerable surface runoff and would require interior drainage modifications and improvements. The levee was designed to prevent flooding from the standard project storm as is required, when economically feasible, for all urban levee projects. Total first costs would be approximately $6,691,000, and annual charges would be $276,300, resulting in an overall benefit-cost ratio of 1.12 based on a 100-year economic life.

6.07 Flood warning. A system which would alert residents to impending flooding was briefly considered. Because this method would be beneficial primarily for the saving of lives and a few portable possessions, it was not considered to be encompassing enough in protection to merit implementation. It was rejected because warning would not protect the most expensive investments in the community (i.e., homes, buildings, inventories, and operating equipment) nor would it satisfy the requirements of the law by which the Federal Government supports lending agencies who provide loans for construction or building improvements.

6.08 Flood Insurance. The city of Three Rivers subscribes to the National Flood Insurance Program, and some of the community residents have taken advantage of its coverage. This insurance covers a portion of the replacement cost of buildings and contents. This reduces concern for financial recovery after a flood but does nothing to prevent the mental anguish and public health problems which are of very great significance during and after floods. It was felt that since the community is subject to flooding at such frequent intervals, a method should be selected which would provide for total protection, not merely partial financial restitution.

6.09 Flood Plain Regulation. The city, in effect, has a flood plain regulation in that no federally guaranteed loan for improvement or construction of buildings will be negotiated where the structure is or will be situated on a site which is less than 1 foot above the 100-year flood elevation. Since 80 percent of the city and all of the business district are within the 100-year flood plain, this will relegate the city of Three Rivers to a nonimprovement, nongrowth status. Therefore, this alternative was determined to be economically and socially unacceptable and was summarily dismissed.

6.10 No Action. If no action were taken to correct the flood prone situation, it could be expected that the community would gradually become more decentralized (as is happening now) and eventually cease to exist as a municipality. Much of the foregoing discussion in this report, especially chapter IV, has addressed the problems caused by flooding, the social, economic, and financial miseries associated with flooding, which will continue and possibly worsen with the passing of

time. Thus, this alternative was dismissed as a desirable possibility because, on balance, it is believed that the environmental losses to be caused by levee alignment 1 will be more than compensated for by the improved way of life which will accrue to the citizens of Three Rivers, Texas.

6.11 Summary. Eight different ways of aleviating the agony and cost of recurring floods which plague the city of Three Rivers were evaluated to determine which would provide the desired degree of protection at a cost which could be readily borne by the community citizenry. After weighing the social, economic, and environmental costs of each alternative against the benefits expected to accrue, the alternative labeled "levee alignment 1" was determined to provide the best benefit-cost comparison and for that reason was selected for implementation.

SECTION SEVEN - THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

We can only assume that short-term uses of the environment refer to the life of the project. In the case of the levee for the protection of the city of Three Rivers, Texas, the relationship between the short-term use of the lands on which the protective works will be situated will exactly parallel the long-term productivity of the community. This long-term productivity will result from the diverting of capital and energies now dedicated to recovery from recurring floods and restoring health and safety, to investing them in regional, community, and personal betterment. Land use patterns inside and under the levee system will change, especially agricultural uses. The usual agricultural production on these lands will be diminished or curtailed, but organic production will continue in the form of natural and introduced vegetation for landscaping and protective purposes. It can also be assumed that with the rising crime rates; labor strikes; energy shortages; air, water, and noise pollution; traffic congestion; etc. in the larger cities, the perpetuation of the existence of communities such as Three Rivers will, in the long run, be an enhancement of the long-term productivity for society. In summary, the disturbance of 176.7 acres for the protection of about 1,600 people is but a small investment for the good which may be derived.

SECTION EIGHT - ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Because the proposed action involves the excavation and relocation of quantities of alluvial soils, it would be difficult to visualize this project as having significantly committed resources which would be irretrievable or cause effects which would be irreversible. It will be possible to replace the soils in excavated areas, and nature would restore the flora and fauna in short order. The commitment of concrete and asphalt materials would in essence be nonretractable. Those other resources which could never be recovered are the nonrenewable resource of petroleum burned for equipment propulsion, labor of planning, design, and construction forces, and the capital invested.

SECTION NINE - COORDINATION AND COMMENT AND RESPONSE

9.01 Public Participation Efforts. Federal, State, and regional agencies believed to have an interest in the project were notified by letter of the initiation of the phase I study. Their views on the authorized plan or alternative plans were requested. In addition, a continuous program of public involvement has been maintained throughout the study period. This has been accomplished by direct contacts with city officials, local residents, and through several "workshops" or "planning sessions." At the beginning, the workshops were sparsely attended. Only 12 people attended the first workshop. But as interest in the proposed project grew, the attendance at the meetings increased. At the last "planning session," approximately 120 people attended. The public involvement program gave all persons an opportunity to express their views and furnish specific data on matters pertaining to the study. The open discussions held at the workshops aided the local residents in understanding the major features of the project and why other alternatives were less acceptable.

9.02 Coordination of Draft Supplement. Copies of the draft supplement were coordinated with the following listed agencies, organizations, and other publics.

US Department of Agriculture
US Department of Transportation
US Department of the Interior
US Department of Commerce
US Department of Health, Education, and Welfare
US Department of Housing and Urban Development
Federal Power Commission
Environmental Protection Agency
Advisory Council on Historic Preservation
Federal Energy Administration
Office of the Governor, State of Texas
Department of Highways and Public Transportation
Texas State Historical Survey Committee
State Historic Preservation Officer
Texas Archeological Survey
Coastal Bend Council of Governments
Nueces River Authority
Live Oak County Judge
Three Rivers Mayor
Texas Committee on Natural Resources
Texas Archaeological Society
Citizens Environmental Coalition
Sierra Club
League of Women Voters of Texas
The Nature Conservancy
National Wildlife Federation
Wildlife Management Institute
Izaak Walton League of America, Inc.

Environmental Defense Fund
National Audubon Society
Sportsmen Clubs of Texas
Mrs. A. E. Adlof, Three Rivers, Texas
H. Paul Friesema, Northwestern University, Evanston, Illinois

9.03 Recommendations. During the coordination effort to determine the relationship of the proposed action to land use plans (covered in section III), some actions were recommended by other resource agencies. The following are excerpted recommendations and Corps responses to them. Copies of the agencies' letters follow the excerpted comments and responses.

9.04 Bureau of Outdoor Recreation, USDI. "We suggest that consideration be given to using the top of the levee as a hike and bike trail with access via Tips State Park."

9.04A Response. Consideration has been given to this recommendation during planning, and the local sponsor has been encouraged to consider incorporating this type development into the proposed project.

9.05 National Park Service, USDI. ". . . we do suggest consultation with the State Historic Preservation Officer and a field survey of the project area by a qualified archeologist.

9.05A Response. Both the consultation and survey have been accomplished by a qualified archeologist.

9.06 Office of the Governor of Texas. The Texas Water Quality Board stated, "The matter of particular concern to this agency would be the protection of the City's sewerage plant,. . ."

9.06A Response. The local sewerage treatment plant is to be protected by an expanse of floodwall which will be incorporated into the levee.

United States Department of the Interior

NATIONAL PARK SERVICE
SOUTHWEST REGION
P.O. Box 728
Santa Fe, New Mexico 87501

IN REPLY REFER TO:

L7619

JUL 2 1975

Mr. Gordon A. Walhood
Chief, Engineering Division
Fort Worth District, Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Walhood:

We have reviewed the map depicting the flood protection project proposed for the city of Three Rivers, Texas as per your May 19 request.

We anticipate no conflict with any National Park Service plans or studies in the project area.

For your environmental statement, we do suggest consultation with the State Historic Preservation Officer and a field survey of the project area by a qualified archeologist.

Sincerely yours,

Acting Regional Director
Southwest Region

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
SOUTH CENTRAL REGIONAL OFFICE
PATIO PLAZA, 5000 MARBLE N.E., ROOM 211
ALBUQUERQUE, NEW MEXICO 87110

IN REPLY REFER TO

JUN 4 1975

Mr. Gordon A. Walhood, Chief, Engineering Division
Fort Worth District, Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Walhood:

As requested, we have studied the map depicting the proposed local flood protection project for the city of Three Rivers, Texas. At this time, we neither have, nor do we know of any land use plans which will conflict with the proposed project.

The Texas Parks and Wildlife Department has informed us that Tips State Park is leased to and administered by the city of Three Rivers. The proposed project will be within 200 feet of the park boundary. Sufficient information should be provided in the draft environmental statement to accurately access any impacts the proposed action may have on the park.

We suggest that consideration be given to using the top of the levee as a hike and bike trail with access via Tips State Park.

Sincerely yours,

Rolland B. Handley
Regional Director

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

TEXAS WATER QUALITY BOARD

1700 NORTH CONGRESS AVE. 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

June 9, 1975

Re: Proposed Environmental Statement
Local Flood Protection Project
Three Rivers, Texas

General James M. Rose, Director
Division of Planning Coordination
Office of the Governor
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Dear General Rose:

The staff of the Texas Water Quality Board has reviewed the Corps of Engineers' proposed draft environmental statement for a local flood protection project proposed for the City of Three Rivers, and have noted that the statement must address how the project will either conflict or conform with proposed uses of lands in the project area by other agencies, groups, and individuals.

The matter of particular concern to this agency would be the protection of the City's sewerage treatment plant, which holds both a discharge permit from this agency and also an NPDES permit from the Environmental Protection Agency. The draft statement should address the sewerage system and how they will be protected by the project. In this connection, this agency will provide access to any water quality records, data or reports that be needed or desired for use in the preparation of the draft environmental statement.

We appreciate the opportunity to review this proposed project. If we can be of further assistance, please let us know.

Very truly yours,

Emory G. Long

Emory G. Long, Director
Administrative Operations

cc: Mr. Gordon A. Walhood, Corps of Engineers
TWQB District 12

9.07 Comments and Responses Relative to Review of the Draft Supplement. The following pages display copies of the letters of comment received and excerpted comments with responses where deemed applicable.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 648
Temple, Texas 76501

March 1, 1976

Mr. Gordon A. Walhood
Chief, Engineering Division
Department of the Army
Fort Worth District, Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Walhood:

We have reviewed the draft supplement to the final environmental statement for the Local Flood Protection Project at Three Rivers, Texas.

Our review indicates that, except for the impact on the land now free from flooding which will receive floodwater as a result of the project, the statement adequately describes the impacts the proposed project will have on the environment and contains measures to minimize the adverse effects.

IV-4

We believe that the statement could be improved if additional information was included for the following:

a. Section 4.08 describes that a sizable amount of cropland now free from flooding will receive floodwater as a result of the project. The impact of the flooding could be discussed as to how often it will be flooded and the expected production loss. The plan should provide for treatment of possible increased erosion problems.

b. The statement could be strengthened by inclusion of information on the size and number of farms that may be severed by the proposed levee. Measures should be included to insure that any existing conservation measures remain functional due to severance.

We appreciate the opportunity to review this draft and make appropriate comments.

Sincerely,

Acting

George C. Marks
State Conservationist

Comment: "Section 4.08 describes that a sizable amount of cropland now free from flooding will receive flood water as a result of the project. The impact of the flooding could be discussed as to how often it will be flooded and the expected production loss. The plan should provide for treatment of possible increased erosion problems.

Response: Paragraph 4.08 has been revised to include the expected increase in water elevations resulting from the constructing of the proposed levee. No estimation of expected crop losses to result have been made because the magnitude of change in water surface elevations is so small, the best maps have only 10 foot contour intervals, and the interval lines are so far apart that any estimate could be in error by a large factor. No increase in erosional problems is expected.

Comment: The statement could be strengthened by inclusion of information on the size and number of farms that may be severed by the proposed levee. Measures should be included to insure that any existing conservation measures remain functional due to severance.

Response: To avoid the potential problem of severance and to reduce the local sponsor's share of the project costs, the city of Three Rivers is negotiating with landowners who will be directly affected by the project. The negotiations involve -- if the landowners will donate the needed lands and will permit the city right-of-entry for operation and maintenance purposes, the landowners will be permitted to fence across the levee on property lines so that livestock grazing can be accomplished. Under such an arrangement, existing conservation measures will remain functional.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

1720 Peachtree Road, N. W.
Atlanta, Georgia 30309

8400

February 26, 1976

Mr. John C. Ball, Chief
Planning Branch
Department of the Army
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Ball:

Here are United States Forest Service, State and Private Forestry comments on the draft supplement to the final environmental statement entitled, "Local Flood Protection Project at Three Rivers, Texas".

Since huge trees are known to exist along the drainways, oxbows, and sloughs of the area (page 11-12), the project area should be thoroughly examined for State or National champion trees prior to finalizing the Plan for Improvement. The Texas Forest Service is the authority on champion trees in Texas.

The levee, with abrupt changes in elevation, will accommodate a wide variety of plant and tree species in a small area and is suited for nature-ecological study purposes. We recommend that sections of the levee be planned and planted for this purpose and that such sections have planned trail access. Advice on tree species suitable for specific sites and local sources of planting stock may be obtained from the Texas Forest Service.

Thank you for the opportunity to review and comment on the final EIS for this project.

Sincerely,

ROBERT K. DODSON
Area Environmental Coordinator

Copy: Texas Forest Service

IX-5

Comment: "Since huge trees are known to exist along the drainways, oxbows, and sloughs of the area (page 11-12), the project area should be thoroughly examined for State or National champion trees prior to finalizing the plan for improvement. The Texas Forest Service is the authority on champion trees in Texas."

Response: The Texas Forest Service has informed us that, "The National and State Champion Tree Register does not include any trees within the project area."

Comment: "The levee, with abrupt changes in elevation, will accommodate a wide variety of plant and tree species in a small area and is suited for nature-ecological study purposes. We recommend that sections of the levee be planned and planted for this purpose and that such sections have planned trail access. Advice on tree species suitable for specific sites and local sources of planting stock may be obtained from the Texas Forest Service."

Response: When the landscaping treatment discussed in paragraph 4.07, Esthetic Elements, is being planned, the use of a wide variety of plant and tree species will be considered. We may contact the Texas Forest Service about suitable species for the general area, and location on the levee. Planned trail access will be subject to the agreements between the city of Three Rivers (the local sponsor) and the landowners (some of whom have agreed to donate lands if they are permitted to fence on property lines so that grazing can continue).

United States Department of the Interior

OFFICE OF THE SECRETARY
SOUTHWEST REGION
Room 4030, 517 Gold Avenue SW.
Albuquerque, New Mexico 87101

March 15, 1976

ER 76/78

District Engineer
Corps of Engineers, U. S. Army
P. O. Box 17300
Fort Worth, Texas 76102

Dear Sir:

This responds to Mr. Gordon A. Walhood's letter of January 26, 1976, addressed to the Assistant Secretary - Program Development and Budget, Office of Environmental Project Review, which requested comments on a draft Phase I General Design Memorandum and draft Environmental Statement for Flood Control in the Vicinity of Three Rivers, Texas. We have reviewed these documents and offer the following comments on the draft Environmental Statement.

IX-6

Fish and wildlife resources of the area as well as impacts of the project on these resources have been adequately described. From a fish and wildlife resource standpoint, it appears that the best alternative to the project plan was chosen.

We find, also, that impacts relative to outdoor recreation have been adequately discussed.

The draft statement has a good section about geology concluding with a paragraph on economic geology (para. 2.17). Moreover, it states that "...nor are there any commercially valuable geological products which will be lost." (para. 4.02).

Our review indicates that the project would have no adverse effects on known mineral resources or mineral-production facilities. Thus, presuming that "geological products" means identified (or known) mineral resources, we concur with the quoted remark. However, petroleum, natural gas, and natural gas liquids are produced and

refined in the Three Rivers area, and these important mineral resources should be mentioned in paragraph 2.17 also. Conceivably, undiscovered uranium resources might occur in the favorable host rocks that underlie Three Rivers, but the chance is small that uranium ore lies beneath the project area.

Additional specific comments are listed below.

Page I-5, paragraph 1.10. The R&M project site (alternate to Choke Canyon) is upstream on the Nueces River from the waterworks facilities of the city of Corpus Christi. However, the site is downstream from the existing Lake Corpus Christi.

Page IV-4, paragraph 4.05. Coordination with the State Historic Preservation Officer and the appropriate Federal groups should be indicated.

Page IV-6, paragraph 4.08. The statement says that building the levee as proposed would result in croplands being flooded that would not be flooded without the levee. Has the resulting crop loss been considered in the benefit-cost and other comparisons?

Sincerely,

Willard Lewis
Special Assistant to the Secretary

Comment: ". . . petroleum, natural gas, and natural gas liquids are produced and refined in the Three Rivers area, and these important mineral resources should be mentioned in paragraph 2.17 also."

Response: Paragraph 2.17 has been revised to include the mention of petroleum mineral resources.

Comment: "Conceivably, undiscovered uranium resources might occur in the favorable host rocks that underlie Three Rivers, but the chance is small that uranium ore lies beneath the project area."

Response: The presence of uranium minerals in the Three Rivers vicinity is alluded to in paragraph 2.17, and no attempt has been made to rule out its occurrence however remote.

Comment: "Page 1-5, paragraph 1.10. The R&M project site (alternate to Choke Canyon) is upstream on the Nueces River from the waterworks facilities of the city of Corpus Christi. However, the site is downstream from the existing Lake Corpus Christi."

Response: The last sentence in paragraph 1.10 has been revised to correct the error.

Comment: "Coordination with the State Historic Preservation Officer and the appropriate Federal groups should be indicated."

Response: The original letters requesting the assistance of the Texas State Historical Survey Committee and the National Park Service were mailed on 16 and 19 May 1975, respectively. The Texas State Historical Survey Committee replied by letter dated 29 May 1975 via the Office of the Governor, Division of Planning Coordination. No reply was received from the National Park Service.

Comment: "The statement says that building the levee as proposed would result in croplands being flooded that would not be flooded without the levee. Has the resulting crop loss been considered in the benefit-cost and other comparisons?"

Response: The resulting crop loss has not been considered in the benefit-cost and other comparisons. Paragraph 4.08 has been revised to provide an explanation why.

FEDERAL POWER COMMISSION
REGIONAL OFFICE
819 Taylor Street
Fort Worth, Texas 76102
March 3, 1976

In reply refer to:
PWR-PW

Mr. Gordon Walhood
Chief, Engineering Division
Fort Worth District, Corps of Engineers
P. O. Box 17300
Ft. Worth, Texas 76102

Dear Mr. Walhood:

This is in reply to your January 26, 1976, letter (SWFED-PG) requesting comments on the draft supplement to Final Environmental Statement Local Flood Protection Project at Three Rivers, Texas. These comments are made in accordance with the National Environmental Policy Act of 1969 and the 1973 Guidelines of the Council on Environmental Quality. Our principal concern with proposals affecting land and water resources is the possible effect on bulk electric power facilities, including potential and existing hydroelectric developments on natural gas pipeline facilities.

The proposed Local Flood Protection Project at Three Rivers, Texas will not adversely affect electric power generating facilities.

Please note that these comments are made at field level and do not necessarily represent the official views of the Federal Power Commission. The opportunity to review the report is appreciated.

Sincerely yours,

Joseph H. Flood
Acting Regional Engineer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1600 PATTERSON
DALLAS, TEXAS 75201

March 11, 1976

Mr. Gordon A. Walhood
Chief, Engineering Division
Department of the Army
Fort Worth District, Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Walhood:

We have reviewed the Draft Supplement to the Final Environmental Impact Statement, Local Flood Protection Project at Three Rivers, Texas. The recommended plan consists of constructing a protective earthfill levee about 4.6 miles in length. The levee begins at high ground east of the city and runs clockwise around about three-fourths of the city and ties back to high ground north of the city.

In general, the statement discusses several environmental impacts of the proposed project. However, we are including the following comments for your consideration in preparing the final statement.

1. Air Quality: The discussion of construction impacts on air quality needs to be expanded to include increased vehicular emissions from construction equipment. Also measures which could be taken to mitigate adverse air impacts should be specified.

2. Water Quality: Additional water quality data for the streams in the project area is needed in the final statement. Included should be the parameters mentioned on page II-7 plus fecal coliform counts. Also the statement should discuss the potential effects of the project on water quality during the construction phase.

3. Noise Quality: The final statement should identify sensitive receptors such as schools, churches, hospitals in the project area. The effects of construction noise and the specific precautions for noise abatement and protection of the area residents from construction-related noise should be discussed.

These comments classify your Draft Environmental Impact Statement as LO-2. Specifically we have no objection to the proposed project,

IX-8

however, we are requesting additional information be included concerning air, water and noise quality.

The classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

John C. White
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

[illegible] Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of [illegible] modifications is required and has asked the originating Federal agency to re-assess these aspects.

[illegible] - Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Comment: **"1. Air Quality: The discussion of construction impacts on air quality needs to be expanded to include increased vehicular emissions from construction equipment. Also measures which could be taken to mitigate adverse air impacts should be specified."**

Response: **Paragraphs 4.04 and 5.03 have been rewritten to indicate that increased vehicular emissions from construction in the area will occur because of the project. Also dust control is discussed.**

Comment: **"2. Water Quality: Additional water quality data for the streams in the project area is needed in the final statement. included should be the parameters mentioned on page II-7 plus fecal coliform counts. Also the statement should discuss the potential effects of the project on water quality during the construction phase."**

Response: **Summarized data for the parameters for which standards have been established are presented in paragraph 2.09. Additionally, the potential effects on water quality during construction have been discussed in paragraphs 4.04 and 5.03.**

Comment: **"3. Noise Quality: The final statement should identify sensitive receptors such as schools, churches, hospitals in the project area. The effects of construction noise and the specific precautions for noise abatement and protection of the area residents from construction-related noise should be discussed."**

Response: **The expected change in noise quality is discussed in paragraph 4.04. The abatement of noise from construction machinery can be achieved mostly through the proper muffling of engines. This requirement will be covered by condition(s) of the construction contract.**

Advisory Council
On Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

February 4, 1976

Mr. John C. Ball
Chief, Planning Branch
Corps of Engineers, Fort Worth District
Department of the Army
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Ball:

This is in response to your request of January 26, 1976 for comments on the draft supplement (DS) to the final environmental statement for the proposed Three Rivers, Texas, local flood protection project. For your information, a review of Advisory Council files reveals it was not afforded an opportunity to comment on either the draft or final environmental statement for this undertaking. Nevertheless, the Council has reviewed the DS and has determined that it appears adequate concerning compliance with Section 106 of the National Historic Preservation Act of 1966.

IX-10

However, with respect to compliance with Executive Order 11593, "Protection and Enhancement of the Cultural Environment" issued May 13, 1971, we note that the proposed undertaking will affect five cultural resources which appear to possess archeological significance, and thus may be eligible for inclusion in the National Register of Historic Places. Therefore, pursuant to Section 800.4(a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), which sets forth the steps for compliance with the Executive Order 11593, the Council requests the Corps of Engineers to request in writing an opinion from the Secretary of the Interior respecting the eligibility of the five sites for inclusion in the National Register and inform us of the findings. The Corps is reminded that should the Secretary of the Interior determine the sites are eligible for that status, it should follow the remaining steps set forth in Section 800.4 to evaluate the effects of the undertaking on the five archeological sites and obtain the Council's comments as appropriate.

Until the requirements of the Executive Order 11593 and the procedures are met, the Council considers the DS to be incomplete in its treatment of the cultural resources. To remedy this deficiency, the Council will provide substantive comments on the undertaking's effects on the cultural resources through the process detailed in the procedures. Please contact Michael H. Bureman of the Council staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946, to assist you in completing this process as expeditiously as possible to avoid any unnecessary delays in the implementation of the undertaking.

Your continued cooperation is appreciated.

Sincerely yours,

Louis S. Wall
Assistant Director, Office
of Review and Compliance

Comment: ". . . we note that the proposed undertaking will affect five cultural resources which appear to possess archeological significance, and thus may be eligible for inclusion in the National Register of Historic Places. Therefore, pursuant to Section 800.4(a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R., Part 800), which sets forth the steps for compliance with the Executive Order 11593, the Council requests the Corps of Engineers to request in writing an opinion from the Secretary of the Interior respecting the eligibility of the five sites for inclusion in the National Register and inform us of the findings. The Corps is reminded that should the Secretary of the Interior determine the sites are eligible for that status, it should follow the remaining steps set forth in Section 800.4 to evaluate the effects of the undertaking on the five archeological sites and obtain the Council's comments as appropriate."

Response: The Fort Worth District, Corps of Engineers, has initiated action to start the testing of the five sites to obtain information needed by the Texas State Historic Preservation Officer to determine their eligibility for nomination to the National Register of Historic Places.

FEDERAL ENERGY ADMINISTRATION
REGION VI
DALLAS, TEXAS

P.O. BOX 35228
9800 W. MOCKINGBIRD LANE
DALLAS, TEXAS 75235

TELEPHONE
214-[illegible]

February 4, 1976

John C. Ball
Chief, Planning Branch
Department of the Army
Fort Worth District, Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Ball:

We appreciate the opportunity of reviewing the subject environmental impact statement submitted with your letter dated January 26, 1976.

We have no comments to make on the environmental impact statement except to ask that the successful contractor appoint an officer to act as Energy Conservation Coordinator. This job involves movement of many yards of materials which, in turn, causes use of large quantities of fuel, etc. which will justify extra conservation efforts.

Sincerely,

Dan W. Deaton, Director
Energy Conservation and
Environment Division

Comment: "We have no comments to make on the environmental impact statement except to ask that the successful contractor appoint an officer to act as Energy Conservation Coordinator."

Response: The Corps of Engineers will actively encourage the successful contractor to appoint an Energy Conservation Coordinator.

DOLPH BRISCOE
GOVERNOR

OFFICE OF THE GOVERNOR

March 22, 1976

Colonel Joe H. Sheard
District Engineer
Fort Worth District
Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Sheard:

The draft supplement to the final environmental impact statement (EIS) on the proposed local Flood Protection Project at Three Rivers, Texas, has been reviewed by the Budget and Planning Office and interested State agencies in accordance with the National Environmental Policy Act in 1969 (NEPA).

The enclosed comments of the review participant should be considered in their entirety. The following is a brief summary of these comments:

1. The Texas Water Rights Commission confirmed their previous comments transmitted by letter from the director, Division of Planning Coordination on July 24, 1975. They stated that the draft supplement to the final EIS appears to meet the requirements of NEPA.

2. The Texas Water Quality Board noted the measures included to control erosion and to protect the sewage treatment plant and concluded that the project will not pose significant water quality problems.

3. The Texas Department of Agriculture stated that they will reserve concurrence in this project, pending the provision of an assessment of the impact of the project on agricultural production and income.

4. The Texas Air Control Board concurred in the implementation of the project and stated that it will not conflict with the goals of their State Implementation Plan.

The Texas Department of Community Affairs commented on the excellence of the draft document. The Texas Industrial Commission concurred in the implementation of the project. The Texas State Soil and Water Conservation Board also participated in this review.

EXECUTIVE OFFICE BUILDING • 411 WEST 13TH STREET • AUSTIN, TEXAS 78701

The above comments are provided to assist your planning effort. If we can be of further assistance, please let us know.

Sincerely,

Charles D. Travis, Director
Budget and Planning Office

COT:ds 16/11

Enclosures

cc: Honorable John C. White, TDA
Mr. Robert E. Schneider, TWRC
Mr. Hugh C. Yantis, Jr., TWQB
Mr. Charles R. Barden, TACB
Mr. Ben McDonald, TDCA
Mr. James H. Harwell, TIC
Mr. Harvey Davis, TSSWCB

TEXAS WATER RIGHTS COMMISSION

STEPHEN F. AUSTIN STATE OFFICE BUILDING

March 9, 1976

Mr. Charles D. Travis
Director, Division of Planning Coordination
Office of the Governor
411 West 13th Street
Austin, Texas 78701

Attention: Mr. Albert D. Schutz

Re: U.S. Army Corps of Engineers, Fort Worth District -- Draft Supplement to Final Environmental Statement -- Local Flood Protection Project at Three Rivers, Texas (January 1976).

Dear Mr. Travis:

The Commission staff has reviewed the referenced draft environment report which was transmitted by the Fort Worth District's letter of January 26, 1976 (file reference: SWFED-PG), and in turn, your Office's transmittal letter of February 9, 1976, requesting comments by March 15, 1976.

The Commission staff recommends concurrence in the referenced document because:

1. Analysis of the referenced document indicates that adequate consideration has been given to the earlier review comments submitted to the Governor's Division of Planning Coordination by the Texas Water Rights Commission's letter of June 9, 1975 The Commission's comments, together with those of other State agencies, were transmitted to the Chief, Engineering Division, Fort Worth District by the Governor's Division of Planning Coordination by letter of July 24, 1975. (A copy of the aforesaid correspondence is hereby enclosed for your ready reference. See Enclosure.)

2. The referenced document is believed to fulfill adequately the analytical, administrative, and coordinative requirements of

Section 102(2)(C) of the National Environmental Policy Act of 1969 governing the preparation of environmental impact statements.

We appreciated the opportunity to review the referenced document. Please advise if we can be of further assistance. Notify Dr. Alfred J. D'Arezzo, Special Analyst for Environment and Interagency Coordination, phone (512)475-2678.

Very truly yours,

TEXAS WATER RIGHTS COMMISSION

Robert E. Schneider
Executive Director

RES-AJD:ll

Enclosure
As stated.

IX-14

TEXAS WATER QUALITY BOARD

1700 NORTH CONGRESS AVE.
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

RECEIVED
MAR 10 AM
Div. of Plan. Coord.

March 9, 1976

RE: Draft EIS: Local Flood Protection and Draft Phase I General Design Memo for Three Rivers Project

Mr. Charles D. Travis, Director
Governor's Division of Planning Coordination
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Dear Mr. Travis:

The staff of the Texas Water Quality Board has reviewed the draft environmental impact statement and the draft general design memorandum prepared by the Corps of Engineers covering the local flood protection project at Three Rivers, Texas and have concluded that this activity should not pose any significant water quality problem in this area if proposed measures are carried out. We have noted the proposed measures to protect the Three Rivers sewage treatment plant, and also the measures to protect the area from erosion.

We appreciate the opportunity to review this project. If we can be of further assistance, please let us know.

Sincerely,

Emory G. Long

Emory G. Long, Director
Administrative Operations Division

TO: James H. Rose, Director
Division of Planning Coordination
Office of the Governor
(Attn: State Clearinghouse)

Date: Sent: 2/9/76

Date: Due: 03/04/76

Refer: EIS- 6-02-002

FROM: Mr. Hugh C. Yantis, Jr.

SUBJECT: DEIS: LOCAL FLOOD PROTECTION PROJECT AT THREEE RIVERS, TEXAS AND DRAFT PHASE I GENERAL DESIGN MEMORANDUM, FLOOD CONTROL IN THE VICINITY OF THREE RIVERS, TEXAS

We have reviewed the cited document and our comments as to the adequacy of treatment of environmental effects of concern are shown below:

	Check (√) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	✓	
2. Additional alternatives which should be considered:	✓	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	✓	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources.	✓	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	✓	
6. We identify issues which require further discussion or resolution:	✓	✓

☑ This agency concurs with the implementation of this project.

☐ This agency does not wish to comment on the subject document because:

E
Name & title of Reviewing official

Enclosure(s)

IX-15

TEXAS AIR CONTROL BOARD

PHONE 512/451-5711
6520 SHOAL CREEK BOULEVARD
AUSTIN, TEXAS - 78758

CHARLES R. BARDEN, P. E.
EXECUTIVE DIRECTOR

JOHN L. BLAIR, Chairman
WILLIAM N. ALLAN
JOE C. BRIDGEFARMER, P.E.
FRED HARTMAN

CHARLES R. MAYHEW
D. JACK KILIAN, M.D.
WILLIAM D. PARISH
E. W. ROBINSON, P.E.
WILLIE L. ULICH, M.D., P.E.

February 12, 1976

Mr. John W. Janak, Assistant Chief
Intergovernmental Coordination
Planning Coordination
Governor's Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Re: Draft Supplement to Final Environmental Impact Statement: Local Flood Protection Project at Three Rivers, Texas.

Dear Mr. Janak:

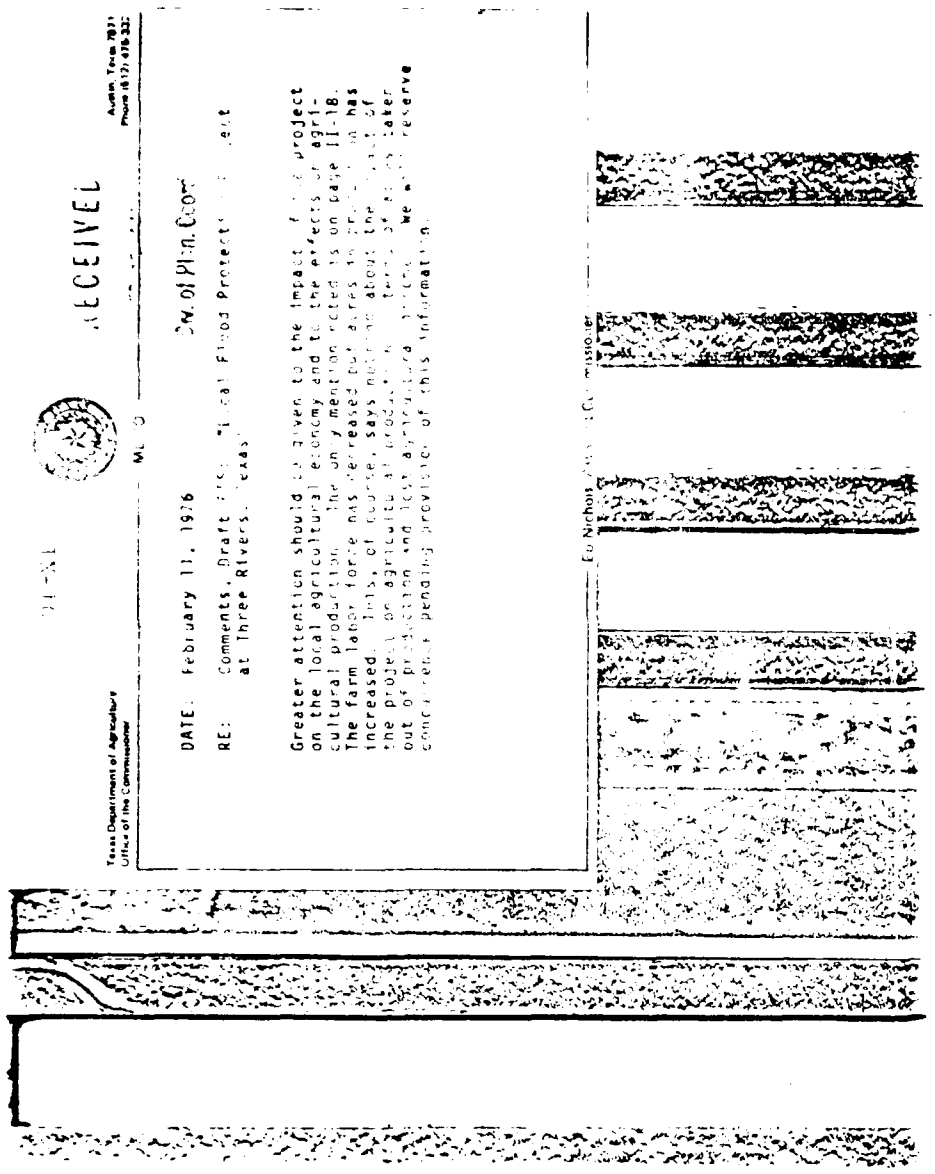
We have reviewed the above cited document. We feel this project will not conflict with our goals as set forth in the State Implementation Plan.

Thank you for the review opportunity. If we can assist further, please contact me.

Sincerely yours,

Bill Stewart, P.E.
Deputy Director
Control and Prevention

cc: Mr. Tom Palmer, P.E., Regional Supervisor, Corpus Christi



RECEIVED

Texas Department of Agriculture
Office of the Commissioner

Austin, Texas 7871
Phone (512) 476-33

DATE: February 11, 1976

RE: Comments, Draft [illegible] Flood Protect[illegible] at Three Rivers, Texas

Greater attention should be given to the impact [illegible] project on the local agricultural economy and to the effects of agricultural production. The only mention noted is on page II-18. The farm labor force has increased [illegible] has increased. This, of course, says nothing about the [illegible] of the project on agriculture in terms of [illegible] taken out of production and [illegible] We [illegible] reserve comments pending provision of this information.

Ed Nichols [illegible] Commissioner

AGENCY REVIEW TRANSMITTAL SHEET

TO: James M. Rose, Director
Division of Planning Coordination
Office of the Governor
(Attn: State Clearinghouse)

Date: Sent: 2/9/76

Date: Due: March 4, 197[illegible]

Refer: EIS-6-[illegible]003

FROM: M. Charles R. Barnes, V.M.A.C.D.

SUBJECT: DRAFT SUPPLEMENT TO FINAL ENVIRONMENTAL STATEMENT: LOCAL FLOOD PROTECTION PROJ[illegible] AT THREE RIVERS, TEXAS

We have reviewed the cited document and our comments as to the adequacy of treatment of environmental effects of concern are shown below:

	Check (X) for each item: None	Comment or [illegible]
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources.	X	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	X	
6. We identify issues which require further discussion or resolution:	X	

[X] This agency concurs with the implementation of this project.

[ ] This agency does not wish to comment on the subject document because:

Bill Stewart

Name & title of Reviewing official
Bill Stewart, P.E., Deputy Director
Control and Prevention

Enclosure(s)

DOLPH BRISCOE
GOVERNOR

OFFICE OF THE GOVERNOR
DIVISION OF PLANNING COORDINATION
STATE CLEARINGHOUSE
Ph. 512/475-6156

JAMES M. ROSE
DIRECTOR

COMMENTS

Type I

None

Type II

None

Excellent environmental statement.

Person Conducting Review (Signature) [signature]

Agency TDCA Date February 10, 1976

SAI No _____ Applicant Flood Protection Project Three Rivers, Texas

OPC 14-019

IX-17

AGENCY REVIEW TRANSMITTAL SHEET

TO: James M. Rose, Director
Division of Planning Coordination
Office of the Governor
(Attn: State Clearinghouse)

Date: Sent: 2/9/76
Date: Due: March 4, 197
Refer: EIS-6-2-003

FROM: Mr James D. Darnell - T. I. C.

SUBJECT: DRAFT SUPPLEMENT TO FINAL ENVIRONMENTAL STATEMENT: LOCAL FLOOD PROTECTION PR AT THREE RIVERS, TEXAS

We have reviewed the cited document and our comments as to the adequacy of treatment of environmental effects of concern are shown below:

	Check (✓) for each item: None	Comment enclosed
1. Additional specific effects which should be assessed:		
2. Additional alternatives which should be considered:		
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:		
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources.		
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:		
6. We identify issues which require further discussion or resolution:		

☑ This agency concurs with the implementation of this project.

☐ This agency does not wish to comment on the subject document because:

*** It occurs to this reviewer that the most noteworthy fact concerning this proposed project is the fact that at the time of its inception the reviewer was 10 years old! It might be interesting to see a history of the funding process.

Neva P. Fisher - Research Planner
Name & title of Reviewing Official

Enclosure(s)

IX-18

IGC

TEXAS STATE SOIL AND WATER CONSERVATION BOARD
1018 First National Building
Temple, Texas 76501
AREA CODE 817, 773-2250

February 27, 1976

RECEIVED
MAR 1 A.M
Div. of Plan. Coord.

Mr. John W. Janak
Assistant Chief, Intergovernmental Coordination
Division of Planning Coordination
411 West 13th Street
Austin, Texas 78701

Dear Mr. Janak:

We have received a draft supplement to the final environmental impact statement for the Local Flood Protection Project at Three Rivers, Texas.

We offer no comment on the draft supplement.

Sincerely yours,

Harvey Davis
Executive Director

HD/lc

Responses to combined comments on Three Rivers Supplement from Office of the Governor, State of Texas, Budget and Planning Office:

Texas Water Rights Commission:

Comment: "The Commission staff recommends concurrence in the referenced document."

Texas Water Quality Board:

Comment: ". . . this activity should not pose any significant water quality problem in this area if proposed measures are carried out."

Texas Air Control Board:

Comment: "We feel this project will not conflict with our goals as set forth in the State Implementation Plan."

Texas Department of Agriculture:

Comment: "Greater attention should be given to the impact of the project on the local agricultural economy and to the effects on agricultural production. The only mention noted is on page II-18. The farm labor force has decreased but acres in production has increased. This, of course, says nothing about the impact of the project on agricultural production in terms of acres taken out of production and lost agricultural income. We will reserve concurrence pending provision of this information."

Response: The project will utilize 176.7 acres of land. Of this total, about 50 acres are utilized for purposes other than agricultural production. Therefore, some 125 acres of improved agricultural lands will be lost to the project. The remaining agricultural lands inside the levee will be protected from even the smallest magnitude flood, thereby permitting a more sustained agricultural production.

Texas Air Control Board:

Comment: "This agency concurs with the implementation of this project."

Texas Department of Community Affairs:

Comment: "Excellent environmental statement."

Texas Industrial Commission:

Comment: This agency concurs with the implementation of this project."

Texas Soil and Water Conservation Board:

Comment: "We offer no comment on the draft supplement."

OFFICE OF THE GOVERNOR

DOLPH BRISCOE
GOVERNOR

March 25, 1976

Colonel Joe H. Sheard
District Engineer
Fort Worth District
Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Sheard:

The Budget and Planning Office recently coordinated the review of the draft supplement to the final environmental impact statement (EIS) on the proposed local Flood Protection Project at Three Rivers, Texas and the Draft Phase I-General Design Memorandum, Flood Control in the Vicinity of Three Rivers, Texas. Subsequent to this review, the enclosed comments were received from the State Department of Highways and Public Transportation, the Texas Water Development Board and Texas Department of Health Resources. The comments of these agencies are forwarded to assist in your planning efforts.

IX-19

Sincerely,

John Janak

John Janak, Assistant Chief
Intergovernmental Coordination
Budget and Planning Office

JJ:ial/1

Enclosure

EXECUTIVE OFFICE BUILDING • 411 WEST 13TH STREET • AUSTIN, TEXAS 78701

Texas Department of Health Resources

Fratis L. Duff, M.D., Dr.P.H.
Director
Raymond T. Moore, M.D.
Deputy Director

1100 West 49th Street
Austin, Texas 78756
(512) 454-3781

Members of the Board

Robert D. Moreton, Chairman
William J. Fanin, Vice-Chairman
N. L. Barker Jr.
Roderic M. Bell
Johnnie M. Berman
H Eugene Brown
Bill Burton
Charles Max Cole
Francis A. Conley
William J. Edwards
Sterling M. Fly Jr.
Raymond C. Garress
Bob D. Glass
Blanchard T. Hollins
Raul Jimenez
Maria LaMantia
Philip Lewis
Royce E. Wisenbaker

March 9, 1976

RECEIVED
MAR 15
Div. of Plan. Coord.

Mr. Charles D. Travis, Director
Governor's Division of Planning Coordination
Executive Office Building
411 West 13th Street
Austin, Texas 78701

ATTENTION: John Janak
Intergovernmental Coordination

SUBJECT: Three Rivers, Texas
Draft Supplement to the Final Environmental Impact Statement and Draft of the General Design Memorandum Phase I, Local Flood Protection

Dear Mr. Travis:

We received a letter dated February 9, 1976, from Mr. John Janak, Assistant Chief, Intergovernmental Coordination, requesting that we review the Draft Environmental Impact Statements on the proposed "Flood Control Project, City of Three Rivers, Texas," submitted by the United States Army Corps of Engineers, relative to public and environmental health implications.

We have completed our review. We feel that the proposed flood prevention project is worthwhile and will not only contribute to the personal safety of the citizens of Three Rivers, but also should reduce mosquito production following heavy rainfall.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

Fratis L. Duff, M.D.
Director

IX-20

AGENCY REVIEW TRANSMITTAL SHEET

TO: James M. Rose, Director
Division of Planning Coordination
Office of the Governor
(Attn: State Clearinghouse)

Date: Sent 2/9/76

Date: Due 3/04/76

Refer: EIS - 6-02-002

FROM: Dr. Fratis Duff - T.D.H.R.

SUBJECT: DEIS: LOCAL FLOOD PROTECTION PROJECT AT THREE RIVERS, TEXAS AND DRAFT PHASE I GENERAL DESIGN MEMORANDUM, FLOOD CONTROL IN THE VICINITY OF THREE RIVERS, TEXAS

We have reviewed the cited document and our comments as to the adequacy of treatment of environmental effects of concern are shown below:

	Check (X) for each item: None	Comment enclosed
1. Additional specific effects which should be assessed:	x	
2. Additional alternatives which should be considered:	x	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	x	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:	x	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	x	
6. We identify issues which require further discussion or resolution:	x	

[x] This agency concurs with the implementation of this project.

[ ] This agency does not wish to comment on the subject document because:

David L. Houston

David L. Houston, P.E., Chief
Field Activities Branch
Wastewater Technology Division, TDHR
Name & Title of Reviewing Official

Enclosure (s)

IX

COMMISSION
REAGAN HOUSTON CHAIRMAN
DEWITT C GREER
CHARLES E SIMONS

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78701

RECEIVED
MAR 15 A
Div. of Plan. Coord.

March 11, 1976

IN REPLY REFER TO FILE NO

Draft Supplement to Final Environmental Statement
Draft General Design Memorandum, Phase 1
US Army Corps of Engineers
Live Oak County

Local Flood Protection Project, Three Rivers, Texas
Flood Control in the Vicinity of Three Rivers, Texas

Mr. John Janak, Assistant Chief
Intergovernmental Coordination
Governor's Division of Planning Coordination
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Dear Sir:

Reference is made to your memorandum of February 9, 1976 transmitting the above captioned documents.

The Department feels that Section 4.08 of the Draft Supplement to Final Environmental Statement should be expanded to show that flood waters which previously passed through the City of Three Rivers will now be diverted around the City and add additional flow through the existing highway bridges on State Highway 72 at the Frio River and US Highway 281 at the Nueces River. The previously Authorized Plan provided for a channel change and a new State Highway 72 bridge at the new channel, but the plan now recommended eliminates this phase of the project.

Prior to implementation of the Flood Control Project, this Department should be furnished sufficient hydraulic data to determine the effects of this diverted water on our structures, and if additional openings, spur dikes, or other measures are required, they must be provided by others.

Sincerely yours

B. L. DeBerry
Engineer-Director

By: Marcus L. Yancey Jr.

Marcus L. Yancey Jr.
Asst. Engineer-Director

cc: Federal Highway Administration

TEXAS WATER DEVELOPMENT BOARD

JAMES M. ROSE
Executive Director

P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711

AREA CODE 512
475-3971
1700 NORTH CONGRESS AVENUE

March 12, 1976

IN REPLY REFER TO
TWDBE-SS

Mr. Charles D. Travis, Director
Budget and Planning Division
Office of the Governor
Executive Office Building
411 W. 13th Street
Austin, Texas 78701

IX-21

Dear Mr. Travis:

Re: Local Flood Protection Project
at Three Rivers, Texas

The draft supplement to the final environmental statement, "Local Flood Protection Project at Three Rivers, Texas," and the draft - "General Design Memorandum, Phase I, Flood Control in the Vicinity of Three Rivers, Texas" prepared by the Fort Worth District, U.S. Army Corps of Engineers, have been reviewed by staff.

Staff believes comments relative to the project made in our June 24, 1975 letter to the Director, Division of Planning Coordination, are still applicable and require no further elaboration. A copy of that letter is enclosed for convenient reference.

We do wish to suggest one change in the draft supplement to the final environmental statement, "Local Flood Protection Project at Three Rivers, Texas." On page VI-1, paragraph 602, we recommend the sentence, "The only purpose of the Choke Canyon project is to provide municipal and industrial water and recreation for the City of Corpus Christi," be changed to read: "The principal purpose of the Choke Canyon project is to provide municipal and industrial water, recreation, and fish and wildlife enhancement for the Coastal Bend Region."

Thank you for the opportunity to comment on the draft reports.

Sincerely,

James M. Rose
Executive Director

Enclosure

Responses to combined comments on Three Rivers Supplement from Office of the Governor, State of Texas, Budget and Planning Office:

Texas Department of Health Resources:

Comment: "We feel that the proposed flood prevention project is worthwhile and will not only contribute to the personal safety of the citizens of Three Rivers, but also should reduce mosquito production following heavy rainfall."

State Department of Highways and Public Transportation:

Comment: "The Department feels that Section 4.08 of the Draft Supplement to Final Environmental Statement should be expanded to show that flood waters which previously passed through the City of Three Rivers will now be diverted around the City and add additional flow through the existing highway bridges on State Highway 72 at the Frio River and US Highway 281 at the Nueces River. The previously Authorized Plan provided for a channel change and a new State Highway 72 bridge at the new channel, but the plan now recommended eliminates this phase of the project."

Response: Paragraph 4.08 has been revised to include expected effects of the project on highway bridges.

Texas Water Development Board:

Comment: ". . . paragraph 6.02, we recommend the sentence,. . . be changed to read: 'The principal purpose of the Choke Canyon project is to provide municipal and industrial water, recreation, and fish and wildlife enhancement for the Coastal Bend Region.'"

Response: The recommended change was made.

DOLPH BRISCOE
GOVERNOR

OFFICE OF THE GOVERNOR
STATE CAPITOL
AUSTIN, TEXAS 78711

March 29, 1976

Colonel Joe H. Sheard
District Engineer
Fort Worth District
Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Sheard:

The Budget and Planning Office recently coordinated the review of the draft supplement to the final Environmental Impact Statement (EIS) on the proposed local Flood Protection Project at Three Rivers, Texas, and Draft Phase 1 - General Design Memorandum, Flood Control in the Vicinity of Three Rivers, Texas. Subsequent to this review, the enclosed comments were received from the Texas Parks and Wildlife Department. The comments are forwarded to assist in your planning effort.

Sincerely,

Charles D. Travis, Director
Budget and Planning Office

CDT:eec 3/11

Enclosure

TEXAS
PARKS AND WILDLIFE DEPARTMENT

CLAYTON T. GARRISON
EXECUTIVE DIRECTOR
JOHN H. REAGAN BUILDING
AUSTIN, TEXAS 78701

March 22, 1976

Mr. John Janak
Governor's Budget and Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Dear Mr. Janak:

The Texas Parks and Wildlife Department has reviewed the Draft Supplement to the Final Environmental Impact Statement: Local Flood Protection at Three Rivers, Texas, and the design memorandum for this project. These two documents correctly reflect coordination between this Department and the Corps of Engineers during project planning.

We feel that the environmental effects of the recommended plan are less severe than would be experienced with construction of the authorized project. Damages to fish and wildlife resources are not expect to be significant.

Thank you for giving us the opportunity to review these documents.

Sincerely,

CLAYTON T. GARRISON
Executive Director

CTG:MW:pg

Response to comments on Three Rivers Supplement from Office of the Governor, State of Texas, Budget and Planning Office:

Texas Parks and Wildlife Department:

Comment: "We feel that the environmental effects of the recommended plan are less severe than would be experienced with construction of the authorized project. Damages to fish and wildlife resources are not expect to be significant."

TEXAS FOREST SERVICE

File 5.7

College Station, Texas 77843
April 19, 1976

Mr. Gordon A. Wathood
Chief, Engineering Division
Corps of Engineers
Department of the Army
P. O. Box 17300
Fort Worth, Texas 76102

Your File: SWFED-PR
March 16, 1976

Dear Mr. Wathood:

We have not received a copy of the draft environmental impact statement on the Three Rivers project from the Division of Planning Coordination.

In reviewing the copy your office recently sent, it is suggested that the flora along the levee and borrow pit sitings be examined by a competent botanist for Endangered or Threatened species to be in compliance with the Endangered Species Act of 1973. It was noted that this was done for fish and wildlife but not for plants. There are more than 60 species of plants currently listed in the Texas Endangered and Threatened Plant List for the South Plains Vegetational Area that includes Live Oak County.

The National and State Champion Tree Register does not include any trees within the project area.

We will be more than glad to work with your office in selecting species of trees and shrubs for planting in the project area.

Sincerely,

Mason C. Cloud
Head, Forest Environment Dept.

MC/jc
cc: Division of Planning Coordination
Robert Dodson, USFS, Atlanta

TX-24

Comment: ". . . it is suggested that the flora along the levee and borrow pit sitings be examined by a competent botanist for Endangered or Threatened species to be in compliance with the Endangered Species Act of 1973. . . . There are more than 60 species of plants currently listed in the Texas Endangered and Threatened Plant List for the South Plains Vegetational Area that includes Live Oak County."

Response: We are aware that some 68 species of plants that deserve protection are listed in the October 1975 issue of the Plant Classification List prepared by the Texas Organization for Endangered Species. We are working with the Soil Conservation Service to obtain the services of a competent botanist to determine if any of the listed plants exist in or near the project area.

Comment: "The National and State Champion Tree Register does not include any trees within the project area."

Response: Noted.

BIBLIOGRAPHY

1. Survey Report on Frio River in the Vicinity of Three Rivers, Texas, U.S. Army Engineer District, Fort Worth, Corps of Engineers, Fort Worth, Texas, 1970.

2. A. H. Belo Corporation, Texas Almanac and State Industrial Guide, 1974-1975, Dallas, Texas, 1973.

3. The Texas Water Plan, Texas Water Development Board, November 19[illegible].

4. The Biotic Provinces of North America, Lee R. Dice, University of Michigan Press, Ann Arbor, 1943.

5. Texas Plants, A Checklist and Ecological Summary, F. W. Gould. Texas A&M University, College Station, Texas, 1969.

6. The Mammals of Texas, William B. Davis, Texas Parks and Wildlife Department, Austin, Texas, Bulletin 41, 1966.

7. Amphibians and Reptiles in Texas, Gerald G. Raun and Fredrick R. Gehlbach, Dallas Museum of Natural History, Bulletin 2, Taxonomic Synopsis, Bibliography, County Distribution Maps, 1972.

8. Poisonous Snakes of Texas and First Aid Treatment of Their Bites, John E. Werler, Texas Parks and Wildlife Department, Austin, Texas, Bulletin 31, 1970.

9. Job Progress Report, Job No. 1, Fish Harvest Regulations and Stocking Recommendations, R. L. McCabe, Federal Aid Project No. F-6-R-19, Texas Parks and Wildlife Department, Austin, Texas, 23 October 1972.

10. The Relations of Vegetation to Bird Life in Texas, Harry C. Oberholser, The American Midland Naturalist, Volume 19, No. 11.

11. The Bird Life of Texas, Harry C. Oberholser, et al., University of Texas Press, Austin and London, 1974.

12. Summary Statements on the Status of the Rare, Endangered, and Peripheral Mammals in Texas, Kay Culbertson and David J. Schmidly, 1974.

13. Social and Economic Effects Assessment: Frio River at Three Rivers, Texas, Department of the Army, Southwestern Division, Corps of Engineers, Dallas, Texas, May 1975.

14. County and City Data Book 1972, A Statistical Abstract Supplement U.S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census.

15. General Population Characteristics, Texas, 1970 Census of Population, U.S. Department of Commerce, Bureau of the Census.

16. Adlof, Mrs. A. E., Historical Sketch of Three Rivers, Texas, furnished by undated letter postmarked 24 June 1975.

17. McGill, B. E., District 16 Traffic Engineer for the Texas Highway Department, Corpus Christi, Texas. Information obtained via telecon on 1 July 1975.

18. General Social and Economic Characteristics, Texas, U.S. Census of Population: 1970, U.S. Department of Commerce, Bureau of the Census.

19. United States Census of Agriculture, 1945, Volume I, Part 26, Texas, Statistics by Counties, U.S. Department of Commerce, Bureau of the Census.

20. 1969 Census of Agriculture, Volume I, Part 37, Texas, Section 2, County Data, U.S. Department of Commerce, Bureau of the Census.

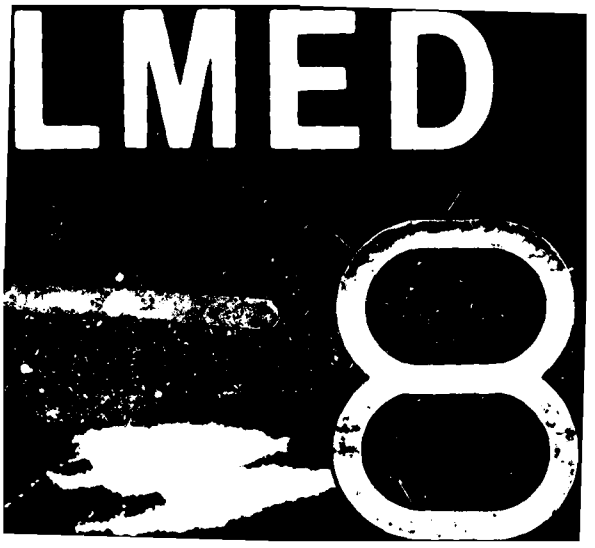
21. Personal communication with members of the Three Rivers public school principal's staff.

SUMMARY ECONOMIC INFORMATION

ECONOMIC DATA EXTRACTED FROM U.S. ARMY CORPS OF ENGINEERS GENERAL *DESIGN MEMORANDUM* "*FLOOD CONTROL IN THE VICINITY OF THREE RIVERS, TEXAS*" COMPLETE DOCUMENT IS AVAILABLE AT U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS.

SUMMARY OF COST AND BENEFITS
(July 1975 price level)
(100-year amortization @ 6.125 percent interest)

First cost	$3,675,000
Federal	(3,437,200)
Non-Federal	(237,800)
Annual charges	247,300
Federal (interest and amortization)	(211,100)
Non-Federal	(36,200)
Interest and amortization	((14,600))
Operation and maintenance	((21,600))
Benefits	404,900
Existing	(394,900)
Future	(10,000)
Benefit-cost ratio	1.64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